PRODUCER
PMI
PHOTO METHODS FOR INDUSTRY
DATE
4/60
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Vol. 3
PRODUCTION
MOTION PICTURE SECTION
SCENE
NO. 4

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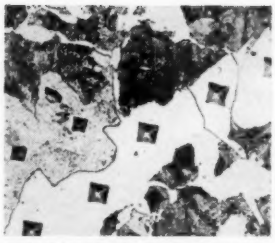
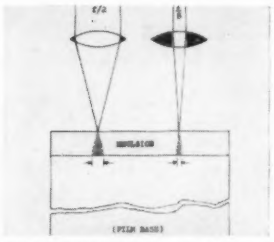
Get more information. Circle 419, page 93

LEICA versatile tool for industry

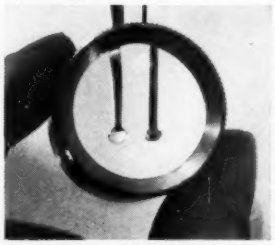


PHOTOMICROGRAPHY – Steel surface greatly magnified through LEITZ microscope, recorded by LEICA. Diamond impressions made by LEITZ tester indicate degrees of hardness.



REPRODUCTION – Details of drawings, documents, books, etc., are reproduced quickly and accurately by LEICA, with FOCO-SLIDE, REPROVIT, or various other attachments.

ON LOCATION–The essential compactness of the LEICA System makes it particularly suited to on-the-spot documentation, even under adverse conditions. Photo by Liesel Springmann.



MACRO PHOTOGRAPHY–Common pin and an unfinished micro-optic under magnifier, photographed with LEICA, lens extension and VISOFLEX. Photo by Liesel Springmann.

CLOSE-UP ACTION – Studies of actual production assembly or details of operation are made easily with LEICA hand-held, when using the unique DUAL-RANGE SUMMICRON lens.

PROMOTION and public relations, important aspects of modern business, beautifully handled by versatile and dependable LEICA photography. Photo: Jones & Laughlin Steel Corp.

You ought to consider the rugged and dependable LEICA M-3 as an investment for your company. The world's most advanced camera (an ultra-precision 35mm camera, we might add), is the heart of a photographic system that meets virtually every requirement of science, industry, of documentation and public relations. And, it's the most economical photographic system you can get. Over 200 precision LEITZ accessories are available as complements of the M-3, extending its versatility to proportions unmatched in the photographic field. You have to see it to believe it–call on a franchised LEICA dealer today, or write:

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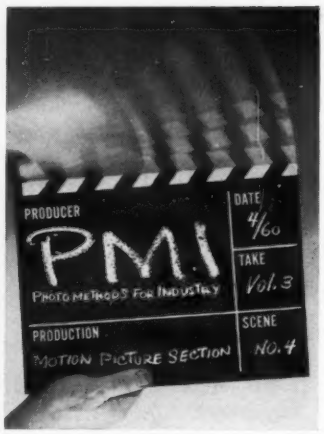

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FEATURES

APRIL, 1960 • VOL. 3 NO. 4

37 EDITORIAL The Critic

52 ANGUTI AT LARGE Socony Mobil man covers a country

57 MEMO ON MONEY Mostly secret, here are a few facts on salaries

58 READERS' SHOWCASE Two pages of pictures from PMI readers

96 MPDFA Photo trade sees 1960's cameras, films, developers, equipment

MOTION PICTURE SECTION

38 TIME LAPSE Built-in-plant, machine triggers motion picture camera

40 LOW BUDGET FILMS In-plant films spur sales, speed training

43 MOVIE SERVICES 125 service organizations for in-plant cine work

50 Rx PHOTOGRAPHY Sturgis-Grant does medical films on prescription

61 IAVA CONVENTION E. E. Reshovsky Industrial A-V men turn up new ideas

PHOTO INSTRUMENTATION SECTION

64 PHOTOGRAPHY IN WEAPONS TESTING L. E. Davidson High-speed work at Aberdeen Proving Ground

69 MANHATTAN IN THE DARK Highly detailed infra-red aerial reconnaissance photographs

70 PHOTO INSTRUMENTATION Ernest E. Reshovsky Varied equipment needed for photo instrumenting missile range

REPRODUCTION SECTION

74 ULTRA-VIOLET LIGHT FOR PHOTO ENGRAVING W. R. Bruce Black light is cleaner, faster in PC work

75 PC TARGET J. K. Cornell Lockheed man pushes standardization

76 REPRODUCTION & GRAPHIC ARTS Herbert P. Paschel Ways to dupe an 8½ x 11 drawing

82 MICROREPRODUCTION Vernon Tate Economics, technology and techniques of microfilm

DEPARTMENTS

8 FYI A column of personalities and news for your information

13 COMING UP Calendar of exhibits, conferences, meetings, etc.

14 LETTERS

16 WORKING PHOTOGRAPHER Tripping cameras from afar. **David B. Eisendrath, Jr.**

24 INDUSTRIAL COLOR Processing control with test strips. **Samuel Lang & Leonard Zoref**

28 ELECTRONIC FLASH Ansco's new balanced color film. **Edward R. Farber**

32 INDUSTRIAL MOTION PICTURES Film making is more than pointing a camera. **Arnold Eagle**

62 IN-PLANT TEST Joseph V. Mascelli reports on the Perfectone 6A tape recorder

90 FREE LITERATURE Booklets, folders, data—yours for the asking

95 NEW PRODUCTS What's new for the industrial photographer

How professional should a camera be?

How much camera should a pro invest in?

First, it depends on the features he needs. If he's like most pros he can't begin to itemize the hundreds of different types of jobs he handles—everything from portraits to microphotography. In the long run he might wind up buying half a dozen "specialized" cameras to fill his requirements.

The single lens reflex Hasselblad eliminates this. With *one camera*, plus interchangeable accessories, you can get over 100 combinations, and set up in seconds for practically every shot known to photography. Four different lenses, three film magazine sizes plus a sheet film holder, four types of viewers—everything changes. The Hasselblad makes it absolutely needless to carry more than one camera on an assignment.

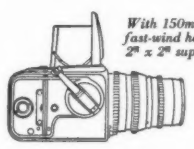
Next, a pro wants quality. How much? Enough to guarantee him perfect results under any circumstances. After all, his living depends on it.

Take the Hasselblad lens. No scrimping on quality here! $226.00 of a Hasselblad's cost is in the lens. Each one is made by Carl Zeiss and has its own Synchro-Compur shutter and automatic diaphragm. Resolving powers permit greater enlargements than virtually any other lens made. For studio work, *color and detail is up to the best you ever got.*

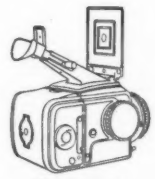
The precision single lens reflex system, of course, completely eliminates parallax. Focus and depth of field appear on the print-size ground glass just as the film will take them. A pop-up magnifier allows you to focus accurately on minute details. There are no surprises waiting for you in the darkroom with a Hasselblad.

Even the ***"conveniences" on the Hasselblad,*** the EVS system, automatic diaphragms (which can also be set manually), and automatic safety devices are to make assignments easier and free you to concentrate on the job. When you use an instrument every day, you have a little convenience coming to you.

How professional should a camera be? As professional as a Hasselblad, *no less.* With Zeiss Planar 80mm f/2.8 lens, $489.50, including F.E.T. Write Dept. HPM-4 for literature and the name of your nearest Hasselblad dealer. PAILLARD Incorporated, 100 Sixth Ave., New York 13, New York.



With 150mm lens, fast-wind handle, 2" x 2" superslide back

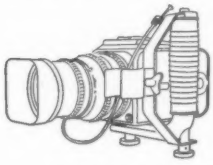


With prismatic sports finder

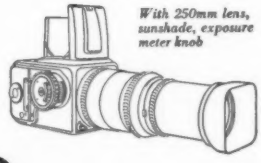
With magnifying hood, 60mm lens, back for 16 1⅝" x 2¼" exposures, exposure meter knob

With sports finder, camera grip, 80mm lens

With magnifying hood, cut film adaptor and holder



With 150mm lens, sunshade, flash gun bracket, back for 12 2¼" x 2¼" exposures



With 250mm lens, sunshade, exposure meter knob

HASSELBLAD

Get more information. Circle 494, page 93

Kodak INDUSTRIAL ROUND-UP

How to make your own super black-and-white developer

Plus some notes on how to enhance picture quality during and after development

There's magic in this formula. We'll gladly share its secret with you.

But first, a word of caution.

No developer, no matter how good, will work at its best with *any and all* film emulsions. We know this by experience. We've obtained our experience by researching and making developers and emulsions under one roof for a long time.

Emulsion-makers and chemists get together to fit emulsion and chemicals together. Stringent tests prove when the fit is perfect.

Made together, tested together, such materials and chemicals should work best together, used as recommended.

We know of no better way.

Now to the developer:

Be sure all ingredients are fresh, active, completely pure. We always test them to be sure. Also, be sure you don't contaminate them while weighing or holding in storage. These are routine requirements to us, ever so important to you.

Buy the best developing agent you can find. You will be using only a little of it. Carefully store the rest.

We're recommending *two*—Elon and Hydroquinone. Each does a slightly different job. Together, they complement each other to do the total job faster, developing full emulsion speed, maximum shadow detail, normal contrast, when used with proper film emulsions.

Use 2.0 grams of Elon, 5.0 grams of Hydroquinone.

IMPORTANT: Measure these and all your ingredients precisely, as we do, in a carefully controlled atmosphere. We find it's best for quality's sake to do all measuring in a year-round air-conditioned room which has undeviating humidity control. Also, take extreme care not to make mistakes. We use quality control inspectors to prevent mistakes.

Add an "accelerator." The magical ingredient that speeds up the developing process; lets you get out of the darkroom more quickly. Accelerators consist of such simple chemicals as caustic soda, sodium carbonate, ammonia, borax, and others. All are common, proven in use for a long time.

Use 2.0 grams of granular borax as your accelerator.

Now, to prevent your developer from becoming weak too quickly, add a "preservative." One of the more common preservatives is sodium sulphite, desiccated. Use 100.0 grams. NOTE: Be sure of purity, and exact quantities.

Dissolve ingredients in exactly 750 cc of water, heated to a constant 125F. Add water to make a liter.

And that's it! A developer for accomplishing sheer wizardry with films like Kodak Professional Plus-X Pan, Panatomic-X, Tri-X Pan, and others.

It's been tested to work together in a perfect fit with those films.

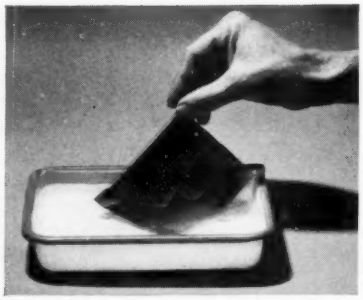
This developer (diluted 1:1) will keep Plus-X grain as fine as advertised. It will let you take full advantage of that film's 200 working index, without shifting contrast. You'll see fine shadow detail, sparkling highlights, delightful middle tones.

Truly, this is a remarkable developer. A real "discovery." As remarkable, in fact, as new Plus-X Film itself.

But why go to all the trouble of doing it yourself?

You couldn't possibly obtain the precision, the quality control, the atmospheric conditions of manufacture, all of which are easy for us. Besides, it will be less costly to you, less time-consuming, if you let us make it for you.

The fact is, we've been making and selling this remarkable developer for a long time. Many professionals are again "discovering" it because results are beautiful with Plus-X Film.



This developer is none other than good old *Kodak D-76*. Sells for 90 cents a gallon, processes 30 rolls per gallon unreplenished.

But note: This time we've recommended D-76 *diluted*. With Plus-X, dilute 1:1 (process approximately 8 minutes at 68F).

You'll see razor-edge sharpness and a fineness of grain, almost as fine as with Kodak Microdol. (Microdol, of course, requires longer development.)

A do-a-lot developer that works best with sheet films

Sheet films—professional. They go hand in hand. But, just as there are different kinds of professionals who take different kinds of pictures, so should there be a developer versatile enough to work together with sheet films, regardless of differences in photographer or subject.

DK-50 is that developer.

Professionals, who like to see nicely graduated negatives because they're the most salable kind, use DK-50, 1:1.

The result is a kind of contrast control, so to speak, where the photographer uses time to his advantage and produces a negative with good gradation through tonal range.

Some photographers, interested in development speed, get what they want to see in a negative by using DK-50 undiluted.

Try DK-50 to get the most out of these films: Tri-X Pan in sheets, packs, and magazines; Royal Pan; Super Panchro-Press, Type B; Super-XX Pan; Portrait Pan; Panatomic-X in sheets; Royal Ortho; Super Speed Ortho; Portrait Sheet Film; Royal-X Pan.

When what goes with what depends on what you want to do

Take prints, for example. And let's talk about image tone.

Did you know we make a developer that will deliberately produce cold tones . . . a developer with excellent development rate and capacity (processes 120 8 x 10's per gallon)? It follows that such warmth in the print. Sunsets, too, take on a glow. And other warm subjects, such as: office interiors, open furnaces, production floors, somehow generate their warmth and "feel" better on warm image tone papers.

But image tone must be uniform to add warmth without intruding. This calls for even rate development, and a special developer that will work together with warm papers to give it to you.

Kodak Selectol is that developer.

It's made to augment the luscious warmth of Kodak PolyLure, Opal, and Ektalure Papers. And, as you know, the warmer the image tone, the better a print is for toning when desired.

Also, we're recommending Kodak

a developer works together very nicely with cold-tone papers.

The name: Kodak Dektol Developer.

Try Dektol with Kodak Polycontrast Papers for happy surprises. Try it also for printing impressive glossies intended for graphic reproduction.

This is no ordinary paper developer. Look at its utility value, not only with papers, but also with certain films for rapid processing.

For instance, Dektol with Kodak Royal Pan Film. Develop in a tray two minutes, using Dektol full strength. Result? An invitation to more of the same.

What's the developer recommended for Kodak Gravure Copy Film? Another job for Dektol.

Working together for prints with warm image tone

The flesh, the complexion—these seem more real and alive with the help of Ektonol Developer for these warm papers. This is a non-carbonate developer, meaning it reduces by far the possibility of print spotting or staining. Particularly when prints are to be toned.

When picture quality is done

There are enhancing tricks we feel compelled to remind you of now and then. Some enhance quality, others economy. One, we know, enhances both.

Kodak Rapid Fixer, for example. A fixing bath for both films and papers. A bear for economy, Rapid Fixer fixes 8 x 10 negatives for, at most, $.0017 each (less in large quantity purchases). Fixes prints for, at most, $.00515 each.

We take time to figure these things pretty close.

For quality enhancement, Rapid Fixer has an agreeable characteristic: hardening control as you want it.

Simply vary the amount of Solution B (hardener) according to judgment.

How about print permanence?

Now we're talking about insurance. Insurance that a print will be permanent. And the stuff that insures it is another of those simple items which perfection concedes to the professional, and which we make.

Kodak Hypo Clearing Agent. The one sure way to remove all the silver hypo complex from film and paper.

You may not be getting permanence, due to cold water washes. Add a two minute rinse in Hypo Clearing Agent before washing, and your water can be as cold as 35°. You'll be sure of permanence after only a 20-minute wash. Works the same for film and papers.

Hypo Clearing Agent is the only clearing agent we've found that will do the job we say it will. So why take chances?

Other beauty aids, and economy moves

There are so many pitfalls in film and paper processing and darkroom practice that we've tried to find handholds to offset them.

Here are a few.

Kodak Photo-Flo . . . it makes water wetter so that the water flows evenly from your film. Preventing water marks and streaks in the first place.

Kodak Indicator Stop Bath is a concentrate. Sixteen ounces makes eight (8) gallons of good, professional stop bath, at a list price of $1.10.

One-half (½) ounce makes a trayful, or a quart, which will process twenty 8 x 10's, at a cost of only three and one-half (3½) cents.

But there's another telling feature that adds even more value to Kodak Indicator Stop Bath.

When it's used up, it tells you to stop using it. It turns purple, which under safelights looks black. When it looks that way, you know it's time to sewer it. And that's a good thing to know about stop baths.

There is a way to avoid print curling, embrittling, cracking, as sometimes happens in the wintertime in heated buildings. Use *Kodak Print Flattening Solution*, which helps keep moisture in the print. Soak prints before drying.

What else?

Stick to those products made together to work together. Your good results will be consistent that way.

Prices are list, include Federal Tax, and are subject to change without notice.

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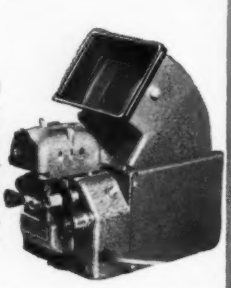

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F.Y.I.

A favorite piece of reading material among photographers we know is the newsletter *35mm Captions* put out by Milt Frier for Leitz. While the eventual purpose is to sell a certain brand of 35mm camera, it contains very valuable information for any 35mm user. Maybe it is Milt's exposure to writing as a UP cameraman or something but it is also quite readable. For a sample, write to Milt Frier, c/o E. Leitz, 468 Fourth Avenue, New York 16, N. Y. on your letterhead, or your company letterhead.

Photographers are urged to search their files for pictures of life in Civil War America. The search, being conducted by the Professional Photographers of America, in cooperation with the National Civil War Centennial Commission, is designed to increase our knowledge of the period. If you have any material, or information on material, write to the National Photographer, 152 W. Wisconsin Avenue, Milwaukee 3, Wisc. The need is especially great for Confederate records.

There is still time to submit photographs of pictures of amateur musicians and their instruments, for a contest, sponsored by the American Music Conference, Chicago, offers a $250 first prize, a $150 second prize and $100 third prize. Closing date for entries is December 1, 1960. Send entries, which should be at least 5 in. in one dimension, to Music Photography Contest, American Music Conference, Philip Lesly Company, 100 W. Monroe Street, Chicago 3, Illinois.

The first group of industrial photographers to be granted a PP of A charter, the Industrial Photographers of Southern California, held their First Annual Awards and Installation Banquet recently. George Emmerson, director of the photography department at Cal Tech's Jet Propulsion Lab, took over the president's duties from Art Thelin, photo supervisor of the Mobil Oil Company. The group has grown into a well-organized, smoothly functioning body of 80 members, devoted to the proposition that the modern plant cameraman is "not a button-pusher or a robot, but a professional serving industry."

Another active group is the Industrial Photographers Association

(*continued on page* 10)

Simplified MICROFILM CAMERA OUTFIT

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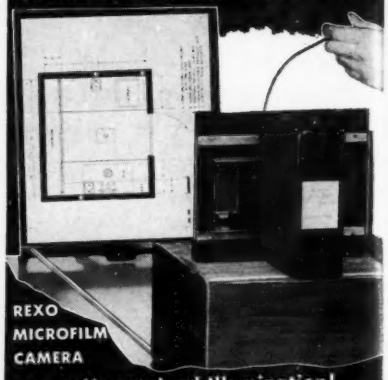

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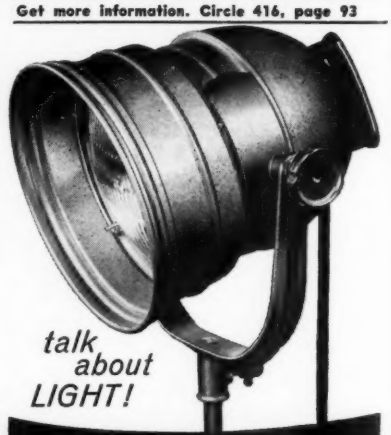

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Equals
a 5,000 watt
studio light!

Used with a Par 64 or Par 56 lamp

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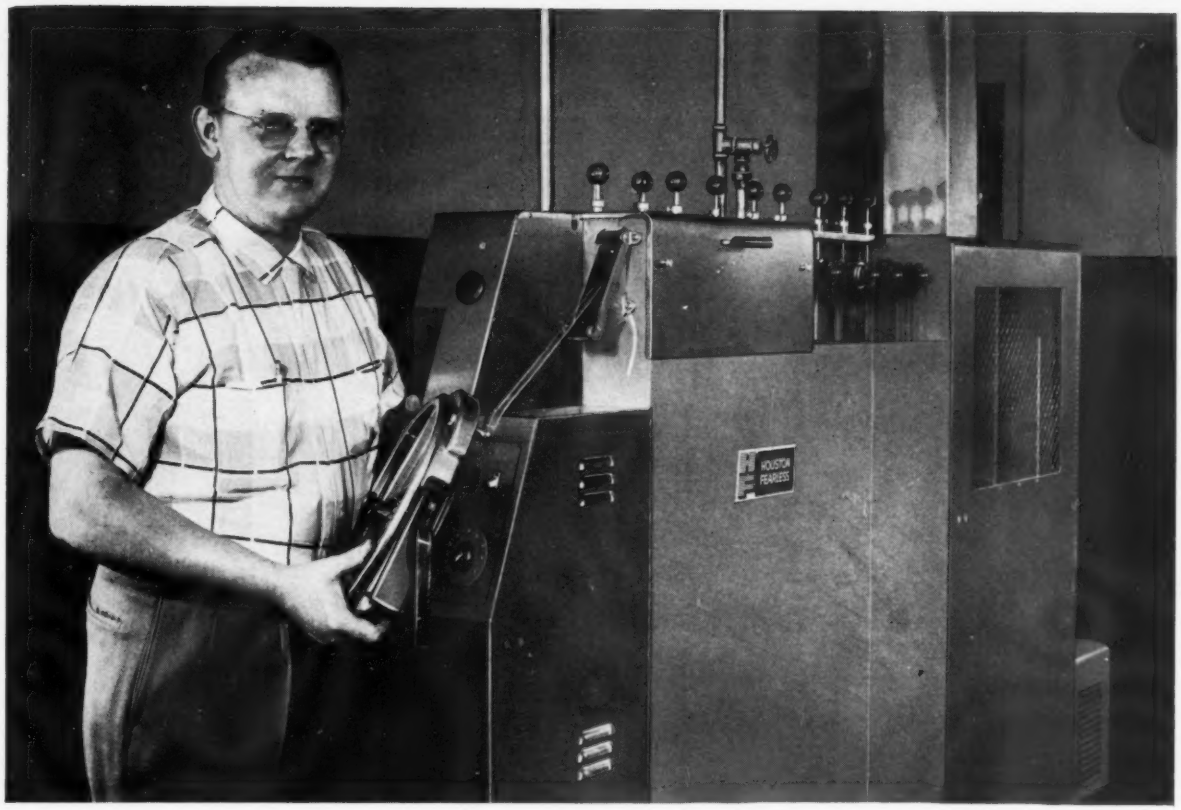
630 S. FLOWER STREET, BURBANK, CALIFORNIA

Get more information. Circle 491, page 93



In the Heart of Hollywood You've Got to be Good!

Located for 24 years in the very heart of Hollywood, Modern Movie Lab is in the most competitive situation imaginable. Most of their work is rush, yet absolute top quality must be maintained. That's why they depend on a Houston Fearless Labmaster*. Here's what Eugene Johnson, President, has to say:

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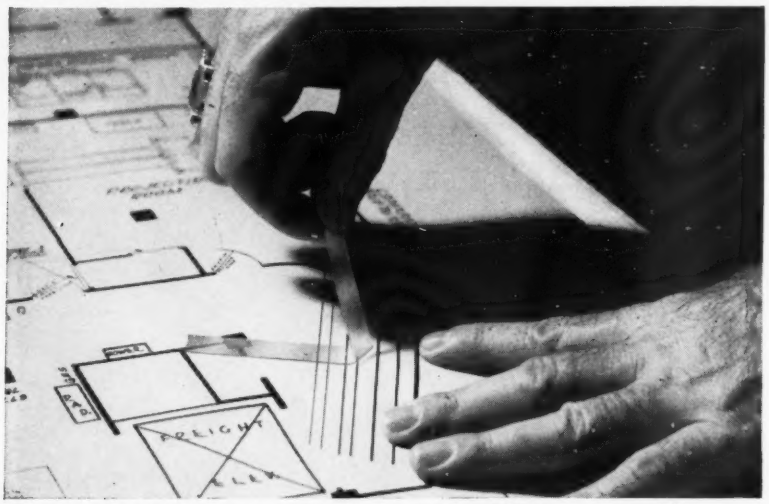
Get more information. Circle 453, page 93

REPRODUCTION TRENDS



TRANSPARENT TAPE TEST *proves remarkable adhesion. Neither reproduced image nor added ink lines can be pulled by tape from* POST *"wash-off" reproductions. They will not rub off under any circumstances. But, a moistened eraser will remove any reproduced detail or section instantly.*

"Wash-off" reproductions preserve originals

Many reproduction departments are turning to newly-improved POST "wash-off" cloth or film to rejuvenate old originals or to duplicate new tracings. And, in addition to serving as duplicate masters, two recent improvements in coating give excellent image adhesion and shelf-life up to 12 months—an extraordinary development compared to other formulations.

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POST "wash-off" materials may be handled in normal room light, are exposed to a strong light source with a suitable negative. Printing speed is consistent, due to the long-life coating. After exposure, preferably under a vacuum frame, wash with water, then swab lightly to remove the unexposed emulsion. Following tray development with POST 227B Developer, wash and swab again before air drying. No need for delicate handling or for a fixer.

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Get more information. Circle 503, page 93

F. Y. I.

(continued from page 8)

of America who held a successful 12 Anniversary Dinner at the Friar Tuck Inn, Cedar Grove, N. J. Regular meetings are held once a month at Newark, New Jersey's Hotel Essex House. Officers of the group include Martin Shemanski (Thiokol), President; Tom Holberton (Colorama), VP; Arthur Hansen (DuPont), Treasurer and Peter Petruccelli (Emerson Radio), Secretary.

Information please

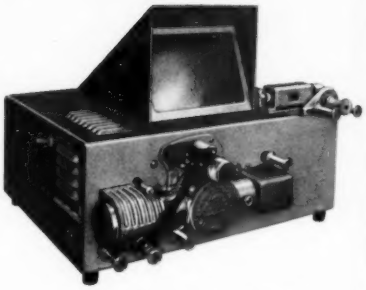
We recently received a letter which made a great deal of sense. Written by the chief of a large photo section, it asked for a schedule of events . . . seminars, short courses, conventions, trade shows, etc . . . prepared far enough in advance to enable photographers to plan their time so as to be able to attend these events. See COMING UP page 13.

Here at PMI, we have been trying to do this but we even have trouble finding out about meetings until after they are held. Once more, then, we renew our plea: if you have anything in the works which is of interest to photographers, let us know far enough in advance to report it. We don't even demand all the details in the first notice. Just drop us a card and say "we are planning a show in six months, to be held approximately such and such dates." Please?

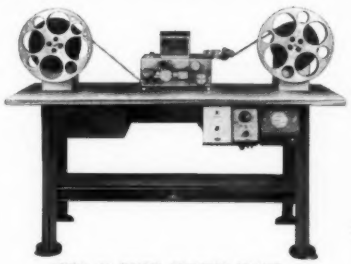
Florman and Babb will now ship rented equipment from their New York office to Florida via free prepaid air freight. Rental will not be charged on transit time, only on time the equipment is in use.

Munich's University of Technology has established an institute for scientific photography under the direction of Prof. Heinrich Frieder. The institute will have both teaching programs in scientific photography and research into such areas as emulsion production, sensitivity of film materials, color etc.

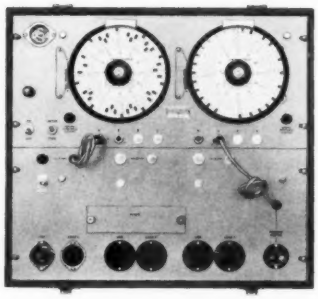
The University of California and ASMP (American Society of Magazine Photographers) are in the planmaking stage of their First Annual Photo-Journalism Conference in the West to be held Sept. 21 to Sept. 24. Hosts will be the San Francisco and Southern California Chapters of ASMP. Speakers lined up so far include John Morris (Magnum), Ansel Adams, Michael O'Leary (Western Electric), Ralph Lyman (Standard Oil) and George Leonard (*Look*). This is only a partial list. Who will be next? Read next month's installment. —THE END



CECO 35MM PROFESSIONAL FILM VIEWER WITH DOUBLE SYSTEM SOUND READER



CECO HI-SPEED EDITING TABLE
(In 16mm and 35mm models)



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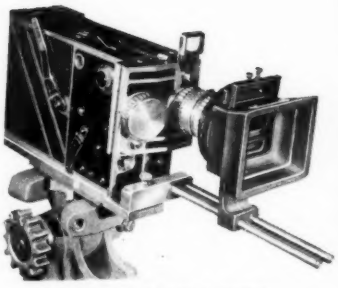

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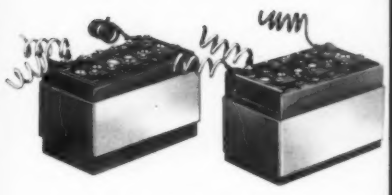
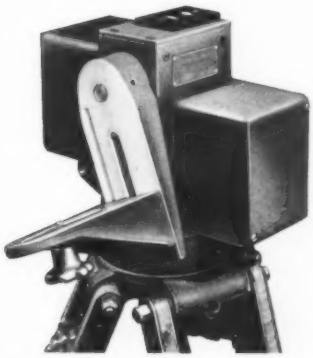
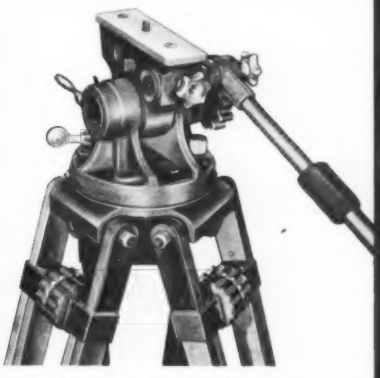


VOLTABLOC NICKEL-CADMIUM LITE-WEIGHT BATTERIES



CECO X-140 REMOTE CONTROL PAN AND TILT HEAD WITH "DIAL-A-STOP"



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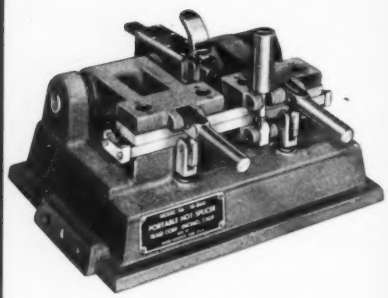

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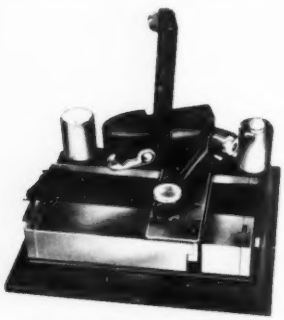

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APRIL 19-21 National Microfilm Association Convention Sheraton-Hilton Hotel, New York, N. Y.

MAY 1-7 Society of Motion Picture and Television Engineers Convention. Ambassador Hotel, Los Angeles, Calif.

MAY 2-6 American Society of Training Directors Annual Conference. Chase, Park, Plaza Hotels, St. Louis, Mo.

MAY 8-9 Fourth Annual Convention of New England Police Photographers Association, Inc. Hotel 128, Route 128, Dedham, Mass.

MAY 9-13 Society of Photographic Scientists and Engineers (SPSE). Miramar Hotel, Santa Monica, Calif.

JUNE 30-JULY 4 Western States PPA Conference. Jack Tar Hotel, San Francisco, Calif.

MONTHLY MEETINGS

FIRST MONDAY • Rochester Chapter of SPSE. Contact Woodlief Thomas, Jr. Color Technology Division, Building 65, Kodak Park, Rochester 4, N. Y. CO 6-2500, Ext. 3784.

FOURTH MONDAY • Rocky Mountain Industrial Photographers. Contact P. H. Broadie, 2170 S. Lincoln, Denver 10, Colo. Telephone PEarl 3-2200.

LAST MONDAY • Southern California SPSE. Contact Ben Augustine, 235 Annandale Rd., Pasadena 2, Calif. Telephone MU 1-0076.

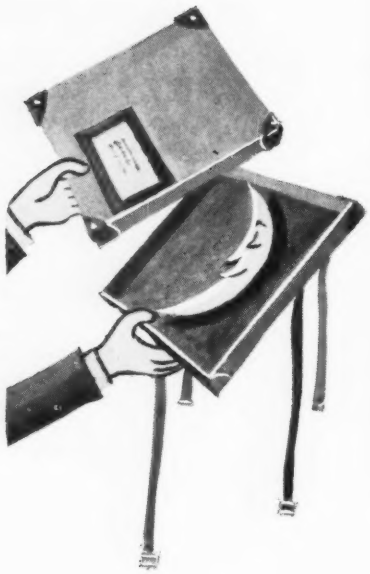
THIRD TUESDAY • Binghamton Chapter of SPSE. Contact H. G. Morse, Ansco, Binghamton, N. Y. RA 2-4221, Ext. 573. • Industrial Photographers of Southern California. Contact Janet Marshall, Executive Secretary, 5463 Virginia Ave., Los Angeles 29, Calif. HO 5-6614.

SECOND AND FOURTH THURSDAY • Industrial Photographers Association. Contact Tom Holbarton, 181 Lake Drive West, Packanack Lake, Wayne, N. J.

(*continued on page* 80)

What we promise . . .

Get more information. Circle 422, page 93



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Get more information. Circle 423, page 93

LETTERS

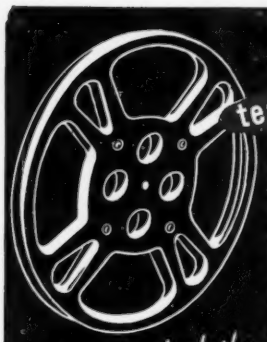
To the Editor:
We were very much disturbed by a portion of [an article on static electricity relating to radioactive static eliminators] which appeared in the February 1960 issue of Photo Methods for Industry. . . .

First, the author states that static eliminating brushes have a short life of real effectiveness. What is a short life—one day, one week, one month, one year, or possibly longer? In the case of our product, Staticmaster, it is unconditionally guaranteed for eighteen months from the time of manufacture, and many users obtain good results for two years and even longer. After the guarantee expires a new element can be installed for half the original cost. In a busy lab, a Staticmaster will pay for itself in less than one week by reducing the labor spent in spotting and opaquing.

The author also states that radioactive static eliminators are not used by most of the professional labs that he knows of. Apparently he has not bothered to check with very many labs because Staticmasters are used in a majority of them. Staticmasters are also used by most of the color labs and by many of the motion picture film processors. We also manufacture a special static eliminating device, called the Commercial Staticmaster, which is sold by Pako Corporation for use with their automatic printers. Thousands of them are being used by photo finishers in this country and abroad.

The author states that many industrial medical departments have said that radioactive static eliminators were dangerous because of the possibility of small flakes of radioactive material becoming dislodged and inhaled. The following information should help to disprove this statement. Staticmasters are manufactured, tested and labeled in accordance with minimum requirements set forth in a valid license issued by the Atomic Energy Commission. Staticmaster products containing up to 500 microcuries of polonium 210 are generally licensed by the Atomic Energy Commission pursuant to 10 CFR 30 Section 30.71 Schedule A (a). Under the provisions of the A.E.C. Regulations our customers for these devices are not required to obtain an A.E.C. Specific License, or take any special precautions other than those outlined in

(*continued on page 22*)



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Get more information. Circle 525, page 93

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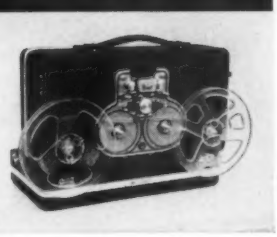
7 lb. recorder/reproducer

The amazing Nomad makes any movie camera a sound camera, any projector a sound projector in professional "lip-sync"

A

B


C

A. Nomad film is split 16mm. Channel #1 on the twin-track record head is used for lip-sync and narrative recording on location. Later, complimentary music from phonograph or tape recorder is "dubbed" on channel #2. Simultaneous playback thru the full width play head mixes music and voice, producing theatre-quality sound.

B. For lengthy sequences, a regular camera D.C. motor can be attached to the Nomad, driving both recorder and camera thru the flexible cable. There is a 180 rpm output in the Nomad camera interlock and a 1440 rpm output for projector interlock. Playback can be double-system, or a 1:1 interlocked transfer from recorder to a striped release print can be made with a magnetic sound projector.

C. Basic film capacity is 100 ft.; the use of simple adapters can increase capacity to 400 ft. or 1200 ft. Entire Nomad system fits compactly into small carrying case.

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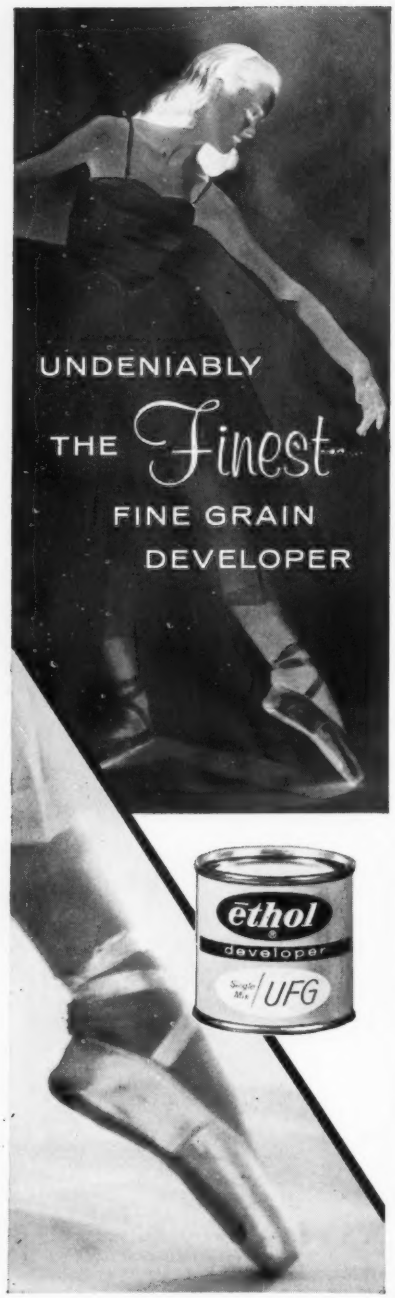

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Get more information. Circle 501, page 93

by David B. Eisendrath, Jr.

WORKING PHOTOGRAPHER

Some comments on tripping the camera fantastically from afar

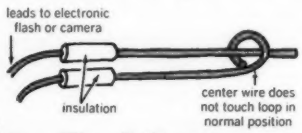
A few months ago in this column I reported an interesting technique suggested by Ed Farber, the electronic flash expert, for having the subject trigger the camera or light.

Ed suggests the use of insulation paper that has an aluminum coat on both sides of a non-conductive paper base. The idea is that by putting an electrical contact on either side of the paper, a circuit can be closed when a metal object penetrates the paper and joins both sides, even though momentarily.

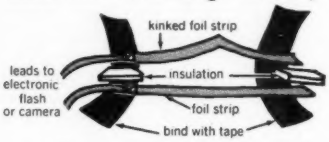
There are so many occasions during scientific or industrial assignments when we need a technique to fire the camera that it might be interesting to discuss some of the methods that I have used. Note that I say "fire the camera"; more properly I should say "make the picture," for often we do not actually fire the camera in these remote control situations, but sometimes work with camera open and have the event itself trigger the illuminant. In high-speed work this is a technique used with continuous-writing equipment and is particularly adaptable to situations where the event is to be made. In still work we have no need to get the camera up to speed, and, of course, can use a solenoid to trip a shutter which in turn will fire the electronic flash or a flashbulb.

Although a long cable release or air hose will let you get a good distance away from the camera, remote control is not always as important as correct timing. Some events occur too rapidly to be caught by human reflexes. As we used to tell young photographers just learning sports photography: "if you can see it, you're too late. You have to push the button before it happens." But adept as a quick-reflexed sports photographer may be at predicting when a slide into third base will be dramatic, many of the things we photograph in industry happen just too quickly for the eye to see.

I once had to photograph a sling shot expert hitting a cigarette in a subject's mouth, much too fast to catch. But strobe lights triggered by wires on the back of the cigarette worked fine. For this sort of thing I used two short pieces of stiff spring wire, each fastened to a contact of a trip wire. These were insulated from each other with tape, and as the ends project I bent a small circle at right angles to one wire and adjusted the other wire to go through this without touching it in normal



position. The slightest jar or jiggle will make the wires touch and the flash goes off. You can also use strips of aluminum foil for this. I sometimes take two strips of foil, sepa-



rate them at both ends with tape, then spread the untaped sections apart. Anything dropping or falling on them will bring them together and make a contact.

Microswitches are also great favorites of mine. A recent series of advertisements showing falling multiwall sacks were made using microswitches to fire a series of electronic flash units as the falling subject moved across the field of the camera. I like the very sensitive microswitch with the long contact arm that can be wired so that the circuit is normally open or normally closed. I have a dozen of these, each one mounted with a small metal base

(*continued on page* 18)

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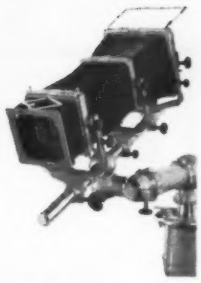

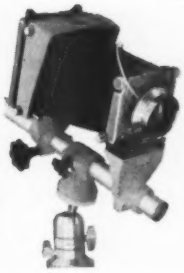

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May 16 • Stickley-Siver

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April 23 • Idaho Camera

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April 28 • Claus Gelotte
May 13 • School St. Camera
June 6 • Ralph Harris

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May 19 • Camera Exchange

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May 14 • Bryar Photo Supply

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April 7 • The Camera Shop

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April 9 • Ernie's

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June 11 • Oak Park Camera Shop

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May 3 • Pipkin Photo Service

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April 23 • Alvin's

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April 6 & 7 • Williams, Brown & Earle

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April 18 • Peerless Camera Stores

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April 2 • Clyed's

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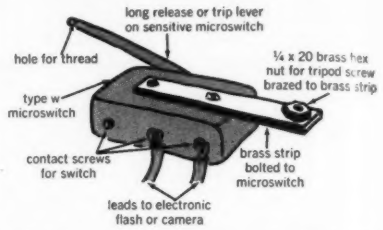
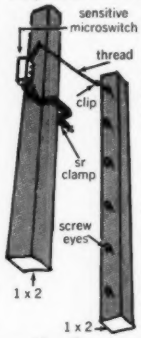
WORKING PHOTOGRAPHER

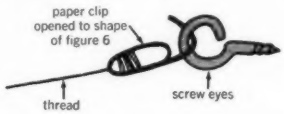
(*continued from page* 16)


long release or trip lever on sensitive microswitch
hole for thread
¼ x 20 brass hex nut for tripod screw brazed to brass strip
type w microswitch
contact screws for switch
brass strip bolted to microswitch
leads to electronic flash or camera

with brass nut to take a standard ¼ x 20 tripod thread. These can then be mounted on SR clamps and swivels; this is a small "C" clamp sold by Graflex with a highly adjustable ball-and-socket featuring a tripod or photo-gadget screw.



An easy way to work with micro-switches, is to put a firm wood upright on each side of the area through which the moving object is to travel. Into one piece of wood I put a number of small screw eyes with the eyes running horizontally. Onto the other piece of wood I clamp my microswitch. A length of fine black cotton or silk thread is attached to the end of the trip-bar of the microswitch, across the set, and is fastened to a paper-clip which has one arm bent open so it looks



like a "6". The thread is wrapped around the body of the clip to shorten it so that the hook end will just fit into the screw-eye and hold the thread taut across the path of the subject. I mentioned cotton thread, or silk because they can't be seen against a background of the right color. Nylon stretches and gives too much. When the thread is pulled taut across the field view, the microswitch on its "C" clamp is turned so that the trip-bar *almost* closes the circuit but not quite. Now, any object falling, flying, or propelled through the area which touches the thread will trip the switch which in turn fires either a camera or electronic flash unit. The paper-clip hook will slip out of the screw-eye and the thread won't break and the whole set-up can be repeated again and again very quickly.

Another technique, more complicated and expensive, is the use of

(*continued on page* 20)

A hundred million potential customers have lured the entire Camera Industry away from the professional market, resulting in an avalanche of amateur cameras and a dearth of versatile, simple precision cameras.

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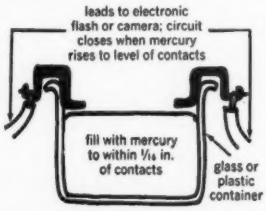
WORKING PHOTOGRAPHER

(*continued from page* 18)

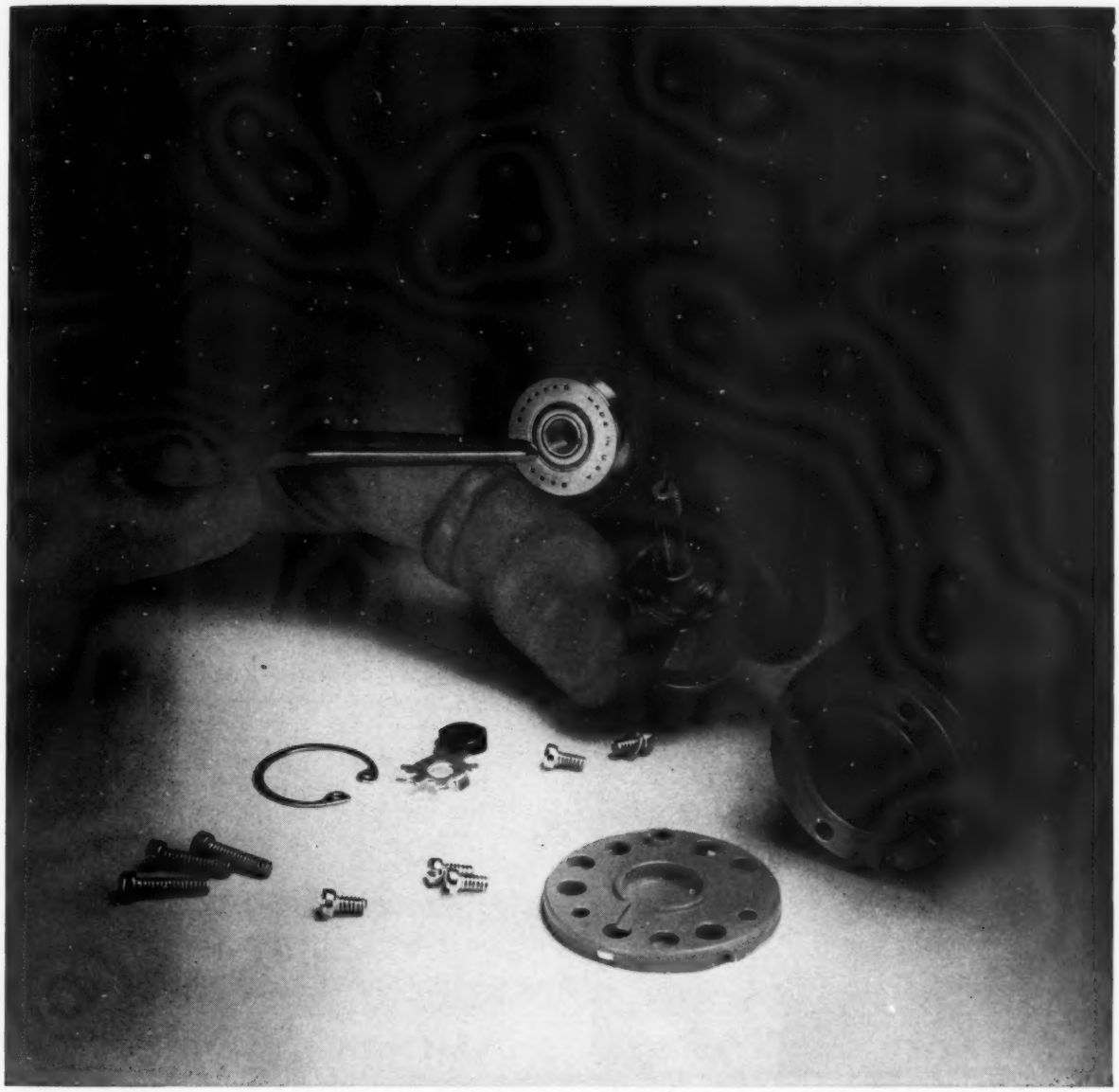
photo-electric cells and light beams. I have several of them that were made up for me by Milton Schwartz, 225 E. 44 St., New York, N. Y., an electronics man who specializes in electronics for photography. The average photocells used for door opening and for burglar alarms are usually not sensitive enough to fire quickly when small objects move very rapidly through the beams. The ones that Schwartz makes are ultra-sensitive and can be adjusted for each situation. I have photographed bats and birds in flight in a cage with the use of two photoelectric cells and light sources. I set these in the cage so one cell is triggered when a horizontal beam of light is broken, the other when a vertical beam is broken. By making the two beams cross each other and having the triggering circuits in series with each other the only time both beams will be broken at once is when the bird is at the crossed beams. The camera is focused here, and from there on out it's easy. Allied Radio, 100 N. Western Avenue in Chicago sells a do-it-yourself lab experimental kit called the Allied Knight Kit with materials for making photo-cell and microphone triggering systems, but they are not as sensitive as the unit Schwartz makes.

I have also seen a unit where a falling object raised a pool of mercury in a beaker and this made a triggering circuit which works fine.


leads to electronic flash or camera; circuit closes when mercury rises to level of contacts
fill with mercury to within 1/16 in. of contacts
glass or plastic container

Henry Lester, the high-speed animal specialist once made some spectacular pictures of a rattlesnake striking at a balloon, in color yet, at 2400 fps. He was using a Kodak High-Speed camera (now the Magnafax) and Lester Lights (he's the man who invented these illuminants which consist of spinning circles of long peak flashbulbs firing in close sequence). However, the strike of the snake was unpredictable and could not be controlled. Henry started the high-speed camera when he thought the snake was going to strike and the lamps were fired *only* when the snake actually struck. This was achieved by mounting the snake

(*continued on page* 108)



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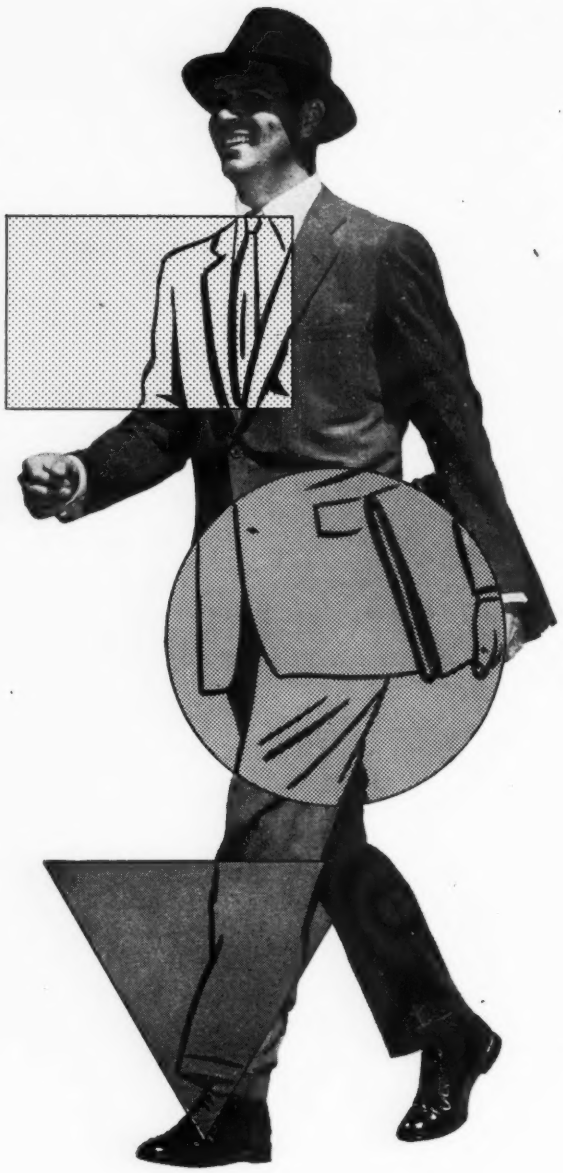

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Get more information. Circle 498, page 93.

(*continued from page* 14)

the simple instructions packaged with each Staticmaster.

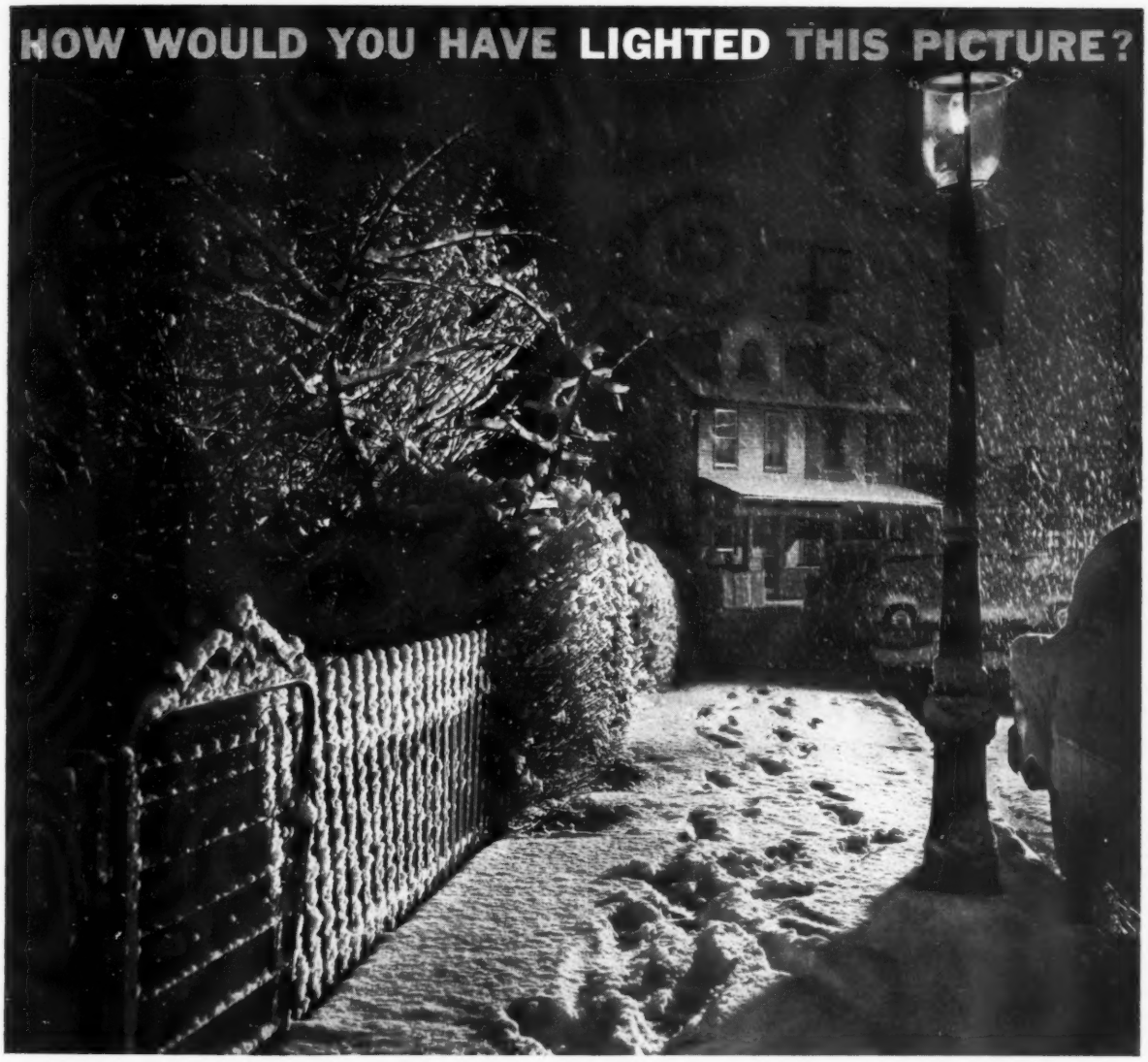
Our Health Physics Consultant, who is also the Chief Health Physicist at the A.E.C. Project located at the University of California at Los Angeles, makes periodic surveys of our plant and these reports are sent to the Atomic Energy Commission in Washington, D. C. He has also made hundreds of spot checks on both new devices as they were going through production, and on old units which have been returned to us after one to three years of use. He has never found external polonium contamination on any of these units, nor any evidence that the radioactive material has broken away from the sealed unit. In addition, we conduct wipe tests of our own on a percentage of all new elements going through our plant. No contamination has ever been discovered.

The polonium foil used in our products is fabricated in the form of a sealed source through a patented process. As far as we know, this method of foil construction is the only one recognized by the Atomic Energy Commission as being one hundred per cent effective in preventing the migration of the active material. The polonium is mixed with powdered gold and compressed into a block and then rolled into a predetermined thickness. It is placed between layers of inactive gold and molded on a silver base, and then again compressed. The block is again rolled to the desired thickness and given a coat of paladium for hardness. Polonium foil fabricated in this manner is then safe to use when installed in a proper metal housing protected by a properly designed grid. Our polonium foil is a pure alpha emitter, therefore no significant beta or gamma radiation is emitted.

In 1952 Liberty Mutual Insurance Company of Boston questioned the safety of Staticmasters, and temporarily caused one of their insured to discontinue the use of our devices. After a most thorough investigation, they wrote to us on April 14, 1953, approving our products. A copy of this letter is enclosed. We think that you will agree it pretty well sums up Liberty Mutual's attitude regarding our devices. [The letter says in part: "We of Liberty Mutual are very pleased to learn that you are able to prepare a polonium foil which prevents the polonium from migrating and results

(*continued on page* 105)

HOW WOULD YOU HAVE LIGHTED THIS PICTURE?



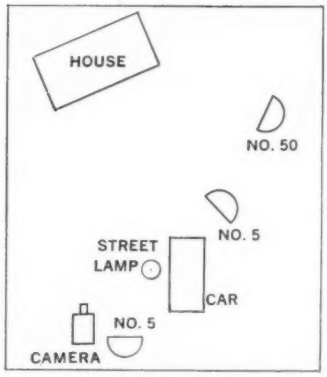
PHOTOGRAPHER RICHARD STACKS MAKES FAST TRACKS TO FREEZE BALTIMORE SNOW STORM WITH G-E FLASHBULBS

"This turned out to be quite an athletic assignment," writes Baltimore Sun Photographer Stacks. "I was shooting snow scenes for our Sunday magazine section when I saw this picture possibility on Vineyard Lane.

"Opening the shutter for a time exposure, I ran down 15 feet behind the automobile to the right. There, I fired a General Electric #5 Flashbulb to light the falling snowflakes.

"With shutter still open, I illuminated the house by running farther down the street and firing a G-E #50 bulb 50 feet from the house. Then, to soften the foreground, I ran back and shot another #5 bulb covered with a handkerchief and without reflector from high above camera, then closed the shutter. Total exposure: 45 sec.

"My camera was a Speed Graphic on a tripod. Royal Pan film, lens opening, f/16. This picture has won numerous prizes for me, thanks to reliable G-E Flashbulbs."



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GENERAL ELECTRIC

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by Samuel Lang & Leonard Zoref

INDUSTRIAL COLOR

Simple and effective processing control with color test strips

Because the manufacture of color film is one of the most difficult achievements of the photographic industry, the films must necessarily vary somewhat from emulsion batch to emulsion batch. In many cases this variation is so slight that the user of today's color films would not be able to see a difference if he looked for it, and therefore the average amateur usually does not notice any variations.

Currently the leeway or tolerance which Kodak and Ansco permit in the user-processed transparency films (Anscochrome, Ektachrome E-1, E-2 and E-3) is plus or minus a CC 10 filter from the norm. In other words films do not enter the market unless tests establish that none of the three color images is off balance by more than an amount correctable by a CC 10 filter. Professionals are forewarned of important variations in data sheets packed with the film.

Of course in setting up tolerances, conditions must be standardized. And the standardized conditions are set up to coincide with average conditions under which the films will be used. Data sheets supply the information on necessary corrections for most such conditions.

If not as tricky as color film manufacture, color processing presents its problems too. The processing kits supplied by Ansco and Kodak for their respective films have a permissible color balance error as do the films.

In the long term average, these slight variations would probably cancel each other out. Certainly we've never seen a consistent error in any direction. However, it is logically possible for the errors to accumulate, and this we have seen in practice. For example a film is off balance by the maximum permitted in, say, magenta. The photographer could cancel this out with a CC 10 green filter, but he doesn't. The film is processed with chemicals that produce an imbalance which is also too magenta by the maximum amount. The photographer looks at his transparency and sees that it is very ruddy indeed, because the two errors have added up to the equivalent of CC 20. This in spite of the fact that both the tolerances toe the line.

Film manufacturers are extremely quality conscious, and do everything that could be reasonably expected to help users get maximum quality in their processing. A keystone in this respect is the quality control strip, supplied for each of their films by Kodak and Ansco. The works consists of an exposed and processed strip, and a set of strips cut from the same film and exposed under identical conditions but unprocessed. The latter are deep frozen immediately after exposure to prevent latent image changes. In the processing lab the procedure is to process one of these quality control strips after x number of run-of-lab films has been developed, and then to compare the quality control strip with the strip exposed and processed by the manufacturer.

In the hands of a person with the proper knowledge and skill a great deal can be read from these quality control strips, including the proper replenishment.

Another method of quality control, or production control, is a continual quantitative analysis of all the chemicals in the processing line, but this demands a chemical testing laboratory, and a man or men to staff it, usually not economically feasible for any but the largest amateur color and motion picture laboratories.

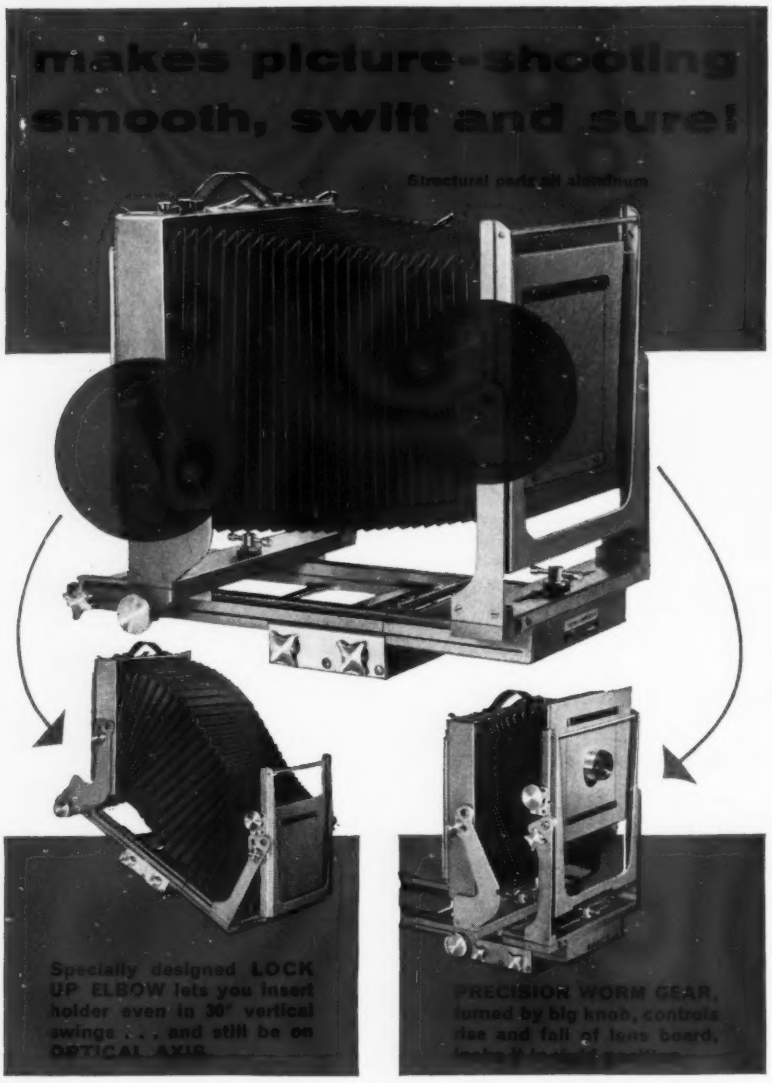
With the quality control strip, however, that is with purely sensitometric testing, it is possible to keep processing quality tolerances within very narrow limits.

We have been using a Welch Densichron Model No. 2 for this. The Macbeth Quantalog, which we reported on in an earlier column is

(*continued on page* 26)

Get more information. Circle 403, page 93

the all-metal calumet 8 x 10 view camera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Specially designed LOCK UP ELBOW lets you insert holder even in 30° vertical swings . . . and still be on OPTICAL AXIS
PRECISION WORM GEAR, turned by big knob, controls rise and fall of lens board,

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Get more information. Circle 420, page 93

INDUSTRIAL COLOR

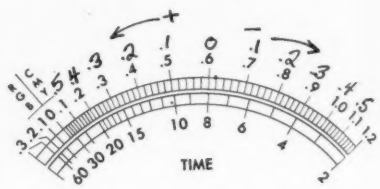
(continued from page 24)

also well suited to this work.

To set up his standard, the lab worker makes density readings of the manufacturer's standard film through the specified red, green and blue filters then he compares these readings with corresponding readings of the strip just out of the processing line.

Naturally the readings have to be carefully done—and the math just as carefully done. To reduce the possibility of mathematical error in computing plus and minus density readings we have adapted the scale of our densitometer somewhat.

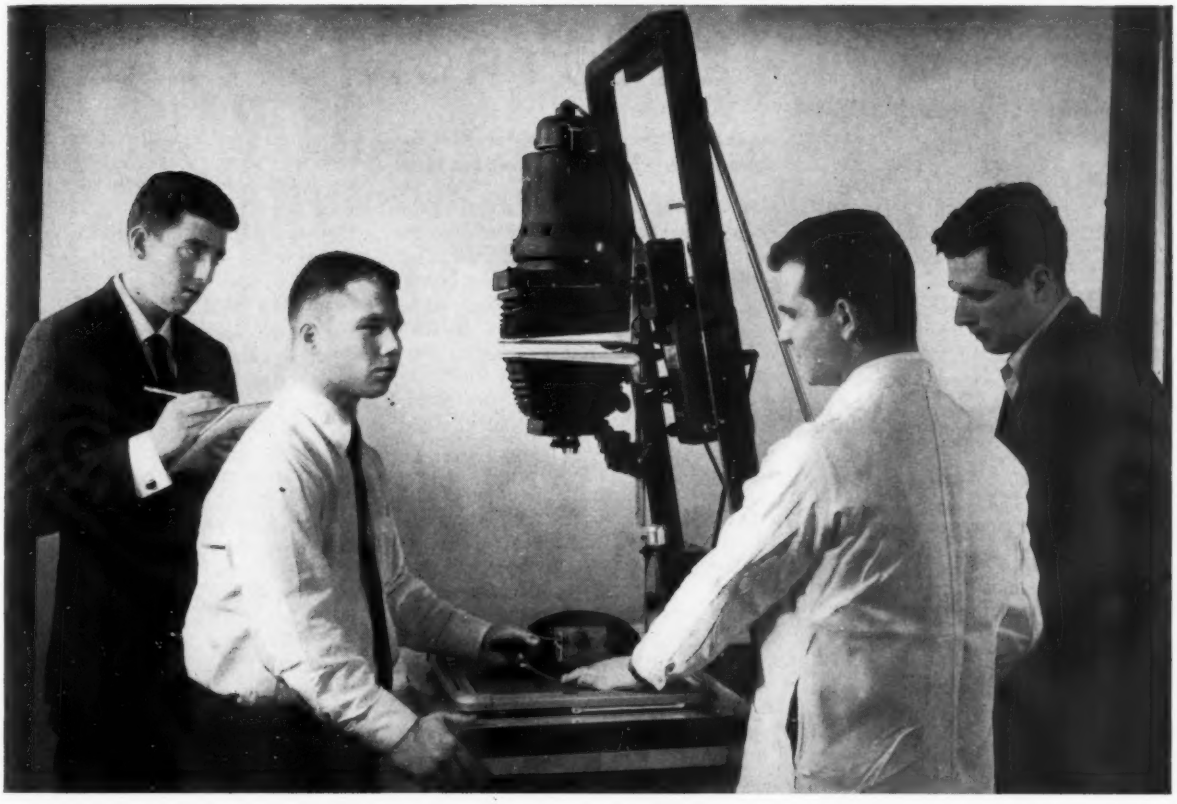
We selected a point near the middle of the density scale. In our case we used .60. This we changed to 0. Anything below the original .60 is a minus figure. Anything above it is a plus figure. With the help of the potentiometers or "volume control" knobs the densitometer is adjusted so that the master, manufacturer-processed strip reads zero through each of the three filters. Any deviations in the corresponding test strip may then be read directly as plus or minus departures from the norm. The illustration shows our adaptation of the scale. The zeroing in is done each time that a strip is read to combat any possible day-to-day fluctuations in the instrument or line voltage.



Of course, making the reading described is only the first part of quality control with sensitometric strips. One swallow does not a summer make, and neither does one reading establish a trend. But by carefully plotting and correlating the results of the tests described here, the processor can assemble a lot of information about his solutions.

Use of continual sensitometric control has turned up some interesting points about processing. For example, if a great number of high key transparencies are processed, the first developer will become exhausted a little faster than usual. But this, as well as normal exhaustion with normal subjects, solution changes when chemicals are unused for a few days, is detectable, and correctible with processing control strips.—THE END

WHY ONLY BESELER MET SCHOOL'S ENLARGER REQUIREMENTS



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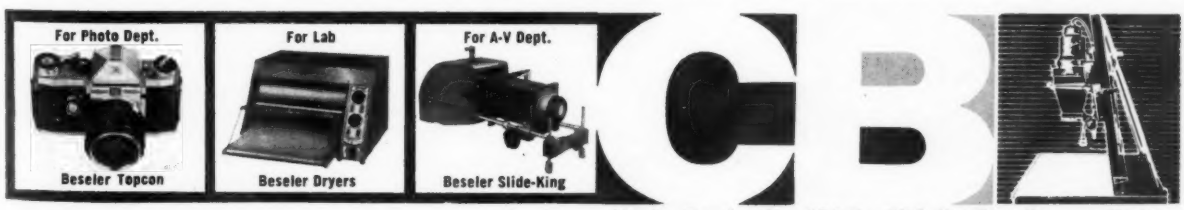

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by Edward R. Farber

ELECTRONIC FLASH

Ansco balances new color film to speedflash time and temperature

The new Super Anscochrome 6500 sheet film should gladden the heart of many an electronic flash user. The name stems from the film's being tailored to the nominal color temperature of electronic flash, 6500K. It is designed moreover to give superior color fidelity with short exposures, an adjunct of electronic flash work with all but the very large studio units.

Although all color films have shown some improvement in color rendition over the Kodachrome blues experienced in the earliest days of electronic flash color—short exposure reciprocity failure has been a problem for most color users to battle. The new Ansco film should prove a valuable ally.

Basic exposure index for Super Anscochrome 6500 film is 100, but it can be pushed to 200 with some sacrifice of color balance and image smoothness. Ansco recommends use of a 30-min. first development time and a 20-min. color development time for this one-stop push.

The film can also be used for regular daylight exposures (nominally 6500K) with the aid of a 10M filter.

SUPER ANSCOCHROME 6500
ELECTRONIC FLASH GUIDE NUMBERS*

Beam Candle Power Second	1800	2675	4000	7000	16000	28000	45000	90000
Watt Second	100	150	225	400	900	1600	2500	5000
Exposure Guide Number	85	100	125	165	250	330	420	600

**These guide numbers are approximate. Users should adjust them to their own equipment.*

Professional approach

It's not easy to calculate electronic flash exposure when reflectors and the size of power packs vary. Of course you can turn to such devices as the new Ascor Integrating Light Meter, the Thomas Strobmeter, the General Radio or Nems-Clarke Integrating Light Meter. Even then a good understanding of what goes on is required to predict exposure accurately because so many variables are involved. A good professional approach is outlined by Harry Parker of Ascor in the Ascorlight 800 Data Sheet. It is well worth writing for and studying. Ascor is at 63-01 Metropolitan Ave., Middle Village 79, New York.

Sequence skylight

Milton Schwartz, who has been doing specialized work in electronic flash for some 15 years, has just come up with a clever modification for his "Skylight." The Skylight, you may recall, is a bank of flashtubes in reflectors designed to give that soft diffuse light so effective in color work. Because each lamp is connected to its own capacitor bank, he has been able to put together, as he says, "a gimmick which plugs into the distribution box, the lamps in turn plugging into it, and a cord leading off to a rotary switch which triggers each lamp independently. The switch can be manually or electrically driven."

I think it should be pointed out that such a system has many advantages over a single-lamp repetitive system. Each flash in the Skylight sequence is the same, 200-watt-seconds. Intervals can be as short as the timer can make them, independent of recharging time. Light output is uniform, even when the intervals are not. Of course, you get only five flashes in sequence from one Skylight, but for many assignments five flashes will suffice.

It is quite possible to do the same thing with a number of separate units, but in the Skylight everything is banked together and therefore there is no laborious set-up.

Compared to a 200-watt-second repetitive unit, Schwartz' unit is low in cost, light in weight, and stingy with electricity. At the rate of 20 flashes per sec., a 200-watt-second repetitive unit would draw at least 4000 watts of AC. Because the Skylight draws its power from the line over a number of seconds, it requires only about three amperes of 110V AC, some 350 watts.

(*continued on page* 30)

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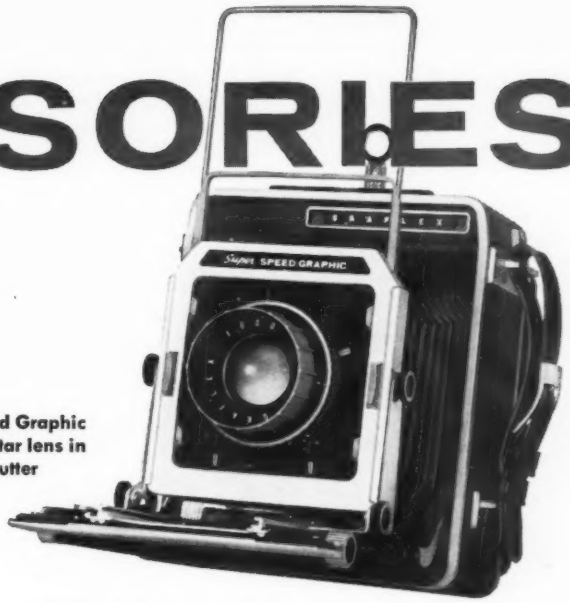

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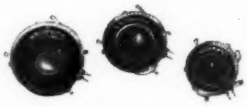

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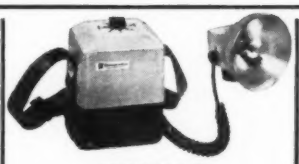

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ELECTRONIC FLASH

(*continued from page 28*)

Wally on the spot

Earlier I mentioned several EF exposure meters. They are accurate and expensive. Recently Wally Kinnard, who manufactures the Spot-O-Matic enlarging timer decided to experiment with his device to see if he could measure his personal color electronic flash exposures. He knew that the cadmium sulfide photo-conductive cell used in his timers had inherent time delay characteristics which might be put to use measuring electronic flash. He found ways to make it work.

If it happens that such measurements can be carried out in total darkness, the only auxiliary equipment needed with a Spot-O-Matic II is a stop watch. The sensitivity pointer is set at 20. The contrast control lever is set to give a convenient time interval. Where it is set depends upon the intensity of the light to be measured.

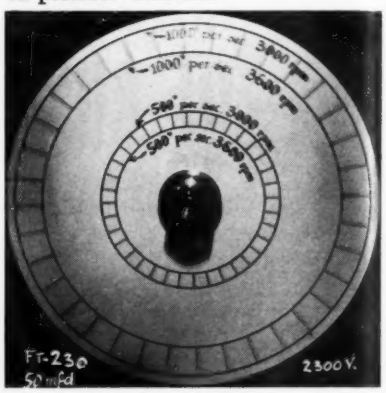
The photosensitive target area is pointed toward the light source. While the unit is fired the stop watch is started—and the signal light on the Spot-O-Matic begins to glow. When the signal light goes out, stop the watch and record the time.

At any given sensitivity and contrast setting, the duration of the signal light's glow can be used to compare the output of two or more electronic flash units, helpful possibly in computing relative guide numbers, comparing reflectors and checking reflector distribution.

If you wish to try this in a lighted room, you could do so with the help of a lens-less synchronized shutter and an enclosure such as a cardboard box or a 4 x 5 Speed Graphic. In the case of the latter, you would use the shutter in its accustomed position and put the timer in the place normally occupied by the spring back and film. You would have to provide light shielding around the timer and a peep hole to view the signal light.

Q. How can one easily determine the action stopping ability of his electronic flash unit?

A. Make a photograph of a marked cardboard disk attached to an electric motor of known rpm. (See name plate on motor.) A standard electric grinder will do well. Be sure to use your usual exposure and developing procedures. Be sure the test is made in subdued light lest ghosting be confused with blurring caused by the flash. Make an enlargement and determine which set of lines is stopped sufficiently. Calculate the circumference of the disk at this point and multiply by the rpm. This will give you the number of inches per second the lines are traveling at this point. For best results, disk should have a larger number of concentric sets of lines than in picture.—THE END



Spinning cardboard disk attached to electric motor aids calculating action stopping ability of electronic flash unit.

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ANGLE OF COVERAGE—60 degrees.
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BEAM CANDLE POWER SECOND RATING—4000.
EFFECTIVE CANDLE POWER SECOND RATING—3950.
COLOR TEMPERATURE—6000 Degrees Kelvin.
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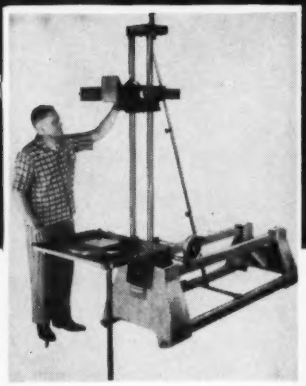

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by Arnold Eagle

INDUSTRIAL MOTION PICTURES

Film making is more than loading and pointing a movie camera

It seems inconceivable that chicken farming and the profession of making films have anything in common, but I have discovered a striking similarity in one aspect. Both of these fields seem to give the impression to some people that one doesn't need any experience or training to become a success. All one must do is plunge right in (usually with closed eyes).

A lot of misguided enthusiasts who are sure of their taste in film and think they know a bad picture when they see one decide that, as long as they know how to thread the film into a movie camera, and know how to expose it, they can do better. But the efforts of an inexperienced film maker cannot have any cinematic value, no matter how smart he is, and however artistic his taste, unless he studies cinematic technique or has the expert advice of an experienced film maker. The simple truth is that it is practically impossible to learn film editing, cinematic technique and dramatic construction by simply going to the movies and looking at films. A film audience can become aware of only very superficial expertness. A viewer can appreciate the pictorial composition of a shot; he will be impressed by the literary dramatic construction and continuity of the film. Occasionally, he may become aware of a clever dissolve or an obvious optical trick. But, generally speaking, unless he has made a conscious study of cinema technique, he will not see or recognize the intricate detail and fine points that made the film a successful method of communication and enjoyable entertainment. Only by careful analysis, and by scrutinizing the film cut by cut (knowing what one is looking for!) can one discover the great care that went into the film to create the smooth flowing visual continuity, the visual logic, that transports the viewer from the screening place to the film reality of the screen and keeps him there.

Various experiments with the mechanism of seeing and the movement of the human eye while looking have established some interesting facts. The human eye, while looking at a picture, does not concentrate on a fixed point. It starts somewhere at the top of the subject and travels around to the left. The length of time it will dwell on the image on the screen will depend on interest, composition and movement shown. After some exploring, the eye will wander out of the picture to start a new exploration. In a book or magazine, it will be the following page, in an art gallery, it will be the next painting and in a screening room, it will be the illuminated EXIT sign (to escape boredom!) or the ceiling. To combat this tendency of the eye to leave the screen, and to rivet it there, the film maker's best device is movement—an ever changing screen. With each cut, the visual interest is renewed. Shifting a scene from a medium shot to a close-up will accomplish this. But the transition from one shot to the other must be visually logical. This goal is attained by matching movement, by matching action, by matching screen direction, by matching background, lighting and look. This simply means that if the man is wearing a tie in a medium shot, it will be a shock to see him with an open collar in the immediately following close-up, or if the mechanic in the close-up is looking to the right, it will be startling, to say the least, if the next shot shows the object he is observing at the left of the screen. If someone in a medium shot takes a pack of cigarettes from his pocket, it is disturbing to see him smoking in the very next close-up. To cover these breaches in continuity, we can use the intercut, or cutaway shots that serve to distract the audience from the gap in action. A most useful transition to cover a lapse of time or a change of locale may be found in the employment of opticals, such

(*continued on page* 34)

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This unit can be installed on all Arriflex models.

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SUPER-WIDE-ANGLE LENS

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2.8	16"	"
4	14"	"
5.6	12"	"
8	10"	"
11	9"	"
16	8½"	"

APPROXIMATE MECHANICAL SPECIFICATIONS
Overall length beyond lens mount; 4½"; with lens shade; 6"
Front diameter of lens; 3½"
Weight of lens without lens shade; 30 oz.; with shade; 36 oz.
Front dimension of lens shade; 4x6"

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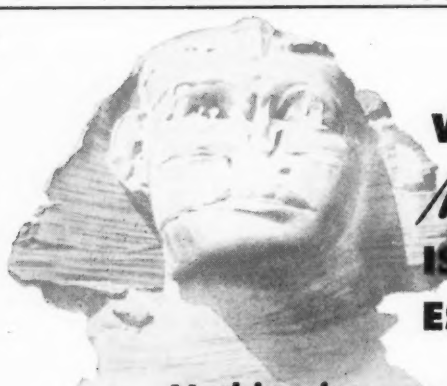

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- **Sound recording**
- **Title services**

GEO. W. COLBURN LABORATORY, INC.

164 No. Wacker Drive, Chicago 6
Telephone DEarborn 2-6286

Get more information. Circle 426, page 93

(*continued from page* 32)

as fade-ins, fade-outs, and dissolves.

There are other types of film besides the one that uses matched continuity. We have the montage technique, cross cutting, parallel cutting, and combinations of these. If a film is cut well, this will be evidenced by the fact that it is understandable and enjoyable even with the sound track cut off. (By the way, projecting a film several times without the sound is a good way to analyze its cinematic technique.) On the other hand, newsreel type films depend completely on the sound track and narration for continuity. They are usually unintelligible without the sound. Unfortunately for the viewer, many in-plant films as well as numerous information and educational movies are shot using newsreel technique. This is simply because one does not have to know cinema technique to shoot newsreel style. Beside the fact that these register motion, they might just as well be a series of still slides. Even the simplest instruction film can be improved by the use of cinematic techniques.

There is not enough space in this column to even touch on all the techniques the film maker must learn before he is ready to make effective films. Rhythm and movement are introduced by varying the length of the cuts. Movement and new meaning are created by putting two or more separate still cuts together. For instance, take three clips of film shot for different purposes on different locations. One shows a close-up of a man suddenly looking up and staring, a second shot shows an extreme close-up of an empty poison bottle (so labeled) on a night table, the third clip is that of a woman sleeping on a couch. Cut the first and second clips in half. First, show the close-up of the man looking up and staring. Then cut to the woman lying on the couch, then back to the staring man, then cut to the bottle, and back to the woman. You have given your audience an impression—the man has suddenly discovered a suicide, the woman.

The British Film Institute has produced a series of analytical films for film students. I have used three of them in my classes in motion picture production with great effect. They vary in length from six to thirty minutes. Entitled *The Film and the Critic*, each one presents a well-known film critic who takes a famous English production and analyzes it from a cinematic point of view. In

(*continued on page* 107)

SYNCHRONOUS SOUND

RYDER SYNC CAMERA DRIVES

&

Perfectone ¼" Tape Recorders

for

Spring Drive, D-C Drive & A-C Drive Cameras

such as

Auricon 72, 74 & 75; Arriflex 35 & 16;

Bolex H-16 Rex; Bell & Howell 70 & 240;

Eastman Cine Special; Eclair Camerette 35-16;

Mitchell 16, NC-35 & BNC-35; Maurer 16

•

MAGNETIC SALES CORP.

1147 No. Vine St. **Hollywood 38, Calif.**

Get more information. Circle 480, page 93

"What's your Pleasure, Gentlemen?"

Everything you need to complete your film—from studio to laboratory services is here in one, convenient location . . .

studio services:

Editorial
Creative Editing
Dialogue Cutting
Music Cutting
Conforming
Preparation of A&B Rolls
Hot Splicing
Syncing
Cutting Room Rental

Art and Animation
Storyboards
Graphic Art
Cartoons
Hand-lettered Titles
Hot Press Titles
Title and Animation Photography

Music
Optical Film, 35mm
Magnetic Film, 35, 17½ & 16mm, ¼-inch Tape
Disc, 33⅓ & 78
Sound Effects

Sound Recording
Location Recording
Narration
Music Recording
Post-dubbing
Re-recording
Mixing
Transfer
Interlocks
Facilities Include Optical and Magnetic 35, 17½ & 16mm, ¼-inch Sync Tape

Screening
16mm Projection
35mm Projection
Interlocks

laboratory services:

Developing Processes
COLOR:
Negative EK 16mm
Positive EK 16mm
Ektachrome 16mm*
Kodachrome 16mm*
Ansco 16mm*
**Processed by film manufacturers' local plant*

BLACK AND WHITE:
Spray Picture Negative, 16 & 35 mm
Spray Sound Negative, 16 & 35mm
Newsreel Negative, 16mm
Spray Picture Positive, 16 & 35mm
Immersion Positive, 16mm
Reversal, 16mm

Printing
COLOR:
Kodachrome, 16mm
Ansco, 16mm
EK Internegative, 16mm
EK Positive, 16mm
Reduction, 16mm
Blow-ups, 35mm
Optical, 16mm
Workprint, 16mm
Masters, 16mm
Answer Prints, 16mm
Release Prints, 16mm

BLACK AND WHITE:
Dupe Negative, 16 & 35mm
Master Positive, 16 & 35mm
Reversal, 16mm
Reduction, 16mm
Blow-ups, 35mm
Optical, 16mm
Track Prints, 16 & 35mm
Work Prints, 16 & 35mm
Answer Prints, 16 & 35mm
Release Prints, 16 & 35mm
TV Spots, 16 & 35mm

Miscellaneous
Edgenumbering
Print Cleaning
Peerless Treatment
Magnetic Striping
Reels
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Write, phone or wire for information and quotations on any and all producer services

byron / motion pictures

1226 Wisconsin Ave., N.W., Washington 7, D.C., FEderal 3-4000 / 1220 East Colonial Dr., Orlando, Florida, CHerry 1-4161

Get more information. Circle 417, page 93

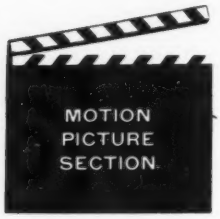
AN EDITORIAL

THE CRITIC

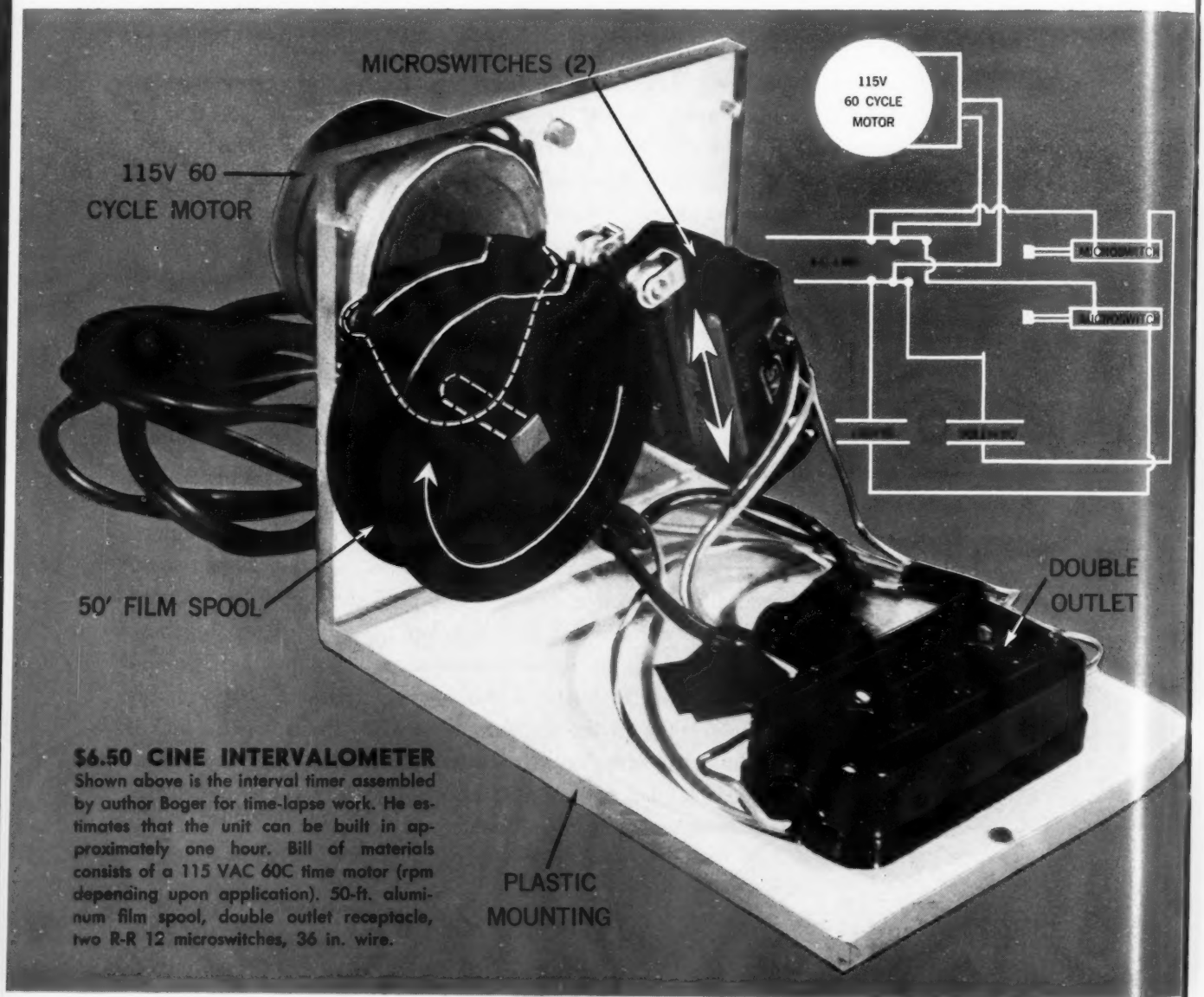
Continually on the hunt for a free meal, a PMI staffer attended a luncheon recently of men who have made their mark in industrial audio-visual communications. While the guests lit up cigars the speaker ignited a fuse. The bomb exploded, rolling the veal cutlet over the peas in our correspondent's well-stuffed vitals. The speaker said flatly that no company can afford to produce motion pictures within the organization! • If heading a staff of four whose sole function is to buy visuals for an international manufacturer qualifies one as an expert, then this man is an expert. He said that no company can afford to keep all the skills necessary for a variety of cinematic presentations on the payroll, when these skills are so easily hired. He tore the biggest hole in a straw man of falsely reported costs. He cited an anonymous case where a motion picture cost a company $7,000 in production and material costs, plus the entire time of several staff members for seven months. Bid from the outside: $38,000, period. The real costs were about the same "and the in-plant film looked like a $7,000 job." • We can forgive this man for the indigestion caused our staffer. But we can't forgive him for being dead wrong. In the first place, his contention is self-defeating because it is absolute. If there is any rule, it's that large companies get their motion pictures from both inside and outside sources —just the way they buy their accounting, engineering, product designing and advertising. In most cases the reasons are sensible. Who needs Goldwyn to shoot 25 ft. on how to set up a sub-assembly? • In the second place, accountants should be given more credit. Most in-plant photographers earn their keep. Either they do the job better and cheaper or someone else does the job. • In the third place, we are ready to testify that we've seen excellent motion pictures done both inside and outside. We've also seen monstrosities perpetrated by both groups. • If we were to try to put our finger on a weakness throughout, we'd probably find ourselves in agreement with the speaker: what many managements lack is an executive who knows the score on visual communications; who knows what a powerful tool they can be and how to put this tool to work; a man who can freely exercise his critical sense on movie maker and user alike.

The Editors

TIME LAPSE



Initiated by the photographic staff, time-lapse studies have proven to be an invaluable aid to scientists and engineers at the Quality Evaluation Laboratory of the U.S. Naval Ammunition Depot, Crane, Ind. Photographer Roddy Boger tells how it's done with simple equipment



$6.50 CINE INTERVALOMETER
Shown above is the interval timer assembled by author Boger for time-lapse work. He estimates that the unit can be built in approximately one hour. Bill of materials consists of a 115 VAC 60C time motor (rpm depending upon application). 50-ft. aluminum film spool, double outlet receptacle, two R-R 12 microswitches, 36 in. wire.

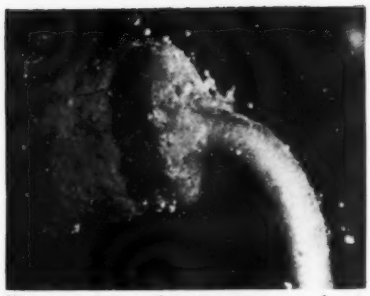
In the preface to his fascinating book on time-lapse photography, *My Ivory Cellar,* John Ott wrote a paragraph that should be remembered by the industrial photographer, "Although I have exposed many feet of motion picture film, I am convinced I have hardly scratched the surface as far as the possible applications of time-lapse photography to all kinds of research projects. I feel that it is the photographer's responsibility to search for these applications and present them to our scientists and engineers." With exactly this idea in mind, the time-lapse program in the Quality Evaluation Laboratory, U. S. Naval Ammunition Depot, Crane, Ind., was begun.

After watching many episodes of Walt Disney's *Secrets of Life,* I decided to try to make a time-lapse movie, sure that once developed, this technique would prove of value in our laboratory work. During one of our few slack periods, a toolmaker and I made a simple interval timer that would operate a camera every three minutes. For subject matter I "borrowed" some extra ordnance items being tested in our laboratories at the time. The change to be studied: corrosion.

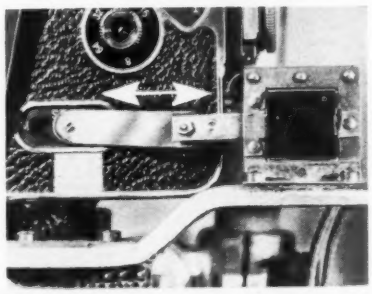
The materials were arranged in front of the camera and periodically were sprayed with a mild solution of acetic acid. During the night hours the "subjects" did not get their regular acid bath. In the finished film it was noticeable that there was not a uniform rate of corrosion. This was, of course, not pointed out to the people who saw the film, and our work was most favorably received. So favorably, in fact, that the film was sent to the U. S. Navy Bureau of Ordnance for viewing. It again aroused interest, and the suggestion was made that we continue to investigate thoroughly the time-lapse method and its applications.

At this time, a visit with John Ott at his Winnetka laboratories proved of immeasurable help. The patience and dedication of this man to time-lapse photography is an inspiration. With information received from him and from other groups using this medium, it was decided that time-lapse cinephotography would be of great value in studies concerned with deterioration of ordnance materials.

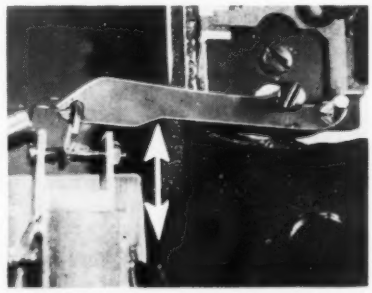
About this time a program in microbiological deterioration was initiated in our laboratories. Our time-lapse program was immediately expanded to meet the needs of the personnel working in the field and most, but not all, of the work carried out since that time has been devoted to microbiological deterioration studies. In addition to photographing fungus spore germination and growth, fungal spore formation and microbial deterioration of a number fo materials, we have, by time-lapse photography, speeded up for viewing the formation of crystals during humid deterioration of gunpowder, the rusting of iron during humid exposure and other physical and chemical phenomena.



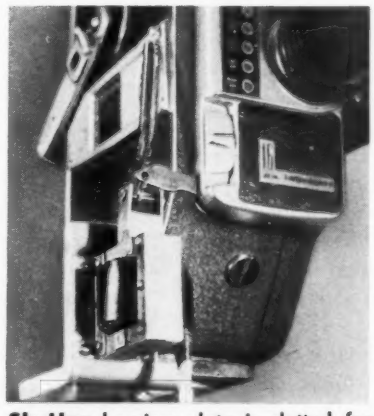
Frame from deterioration study is typical of author's time-lapse films



Solenoid tripping mechanism for Bolex H-16 requires no internal modification of the camera



Adapting the Bell & Howell Model 240 for solenoid operation requires the installation of a trip lever



Shutter housing plate is slotted for tripping lever and returned. Note use of coil spring for tension

But why is time-lapse applied to deterioration studies at all? Deterioration is, in general, a slow process. Study is lengthy and painstaking, and the human eye is incapable of observations over long periods of time without interruption or fatigue. In addition, the deteriorative processes are frequently so slow that changes are not readily perceptible to the unaided eye. The camera, on the other hand, is a continuously alert and impartial observer. With the aid of time-lapse methods, it can compress time scales at will. The deterioration process can be recorded at predetermined time intervals. With the time element greatly compressed, the deteriorating reactions may be studied repeatedly, or can be analyzed frame by frame. The film can even be run in reverse and an event, already known to have happened, can be followed back to its origin. This obviously cannot be done with direct observation. These advantages are extremely desirable in studies by our engineering and scientific personnel.

In discussing the time-lapse program, Dr. Robert Klausmeier, who heads our microbiology program has stated, "without the time-lapse units, we would have needed several more trained technicians to have been able to accomplish the work done during this time. Changes are recorded permanently, accurately and objectively. The film can be shown at a moment's notice to other scientists. Events can be timed, rates can be calculated, tables and graphs can be constructed. In addition, unexpected and often unnoticed changes are recorded and can be detected on repeated viewing. For instance, studies designed only to show the

(*continued on page* 100)

LOW BUDGET

If a two-hour film is an epic and a one-hour film is a plain feature and a twenty-minute film is a short, what can one call a five-minute film? Memo is probably the most accurate term, since it describes the function of these five-minute movies made by Kodak to discuss some of the problems which arise during a day's work at a large corporation. Running about a long as it takes to cook a mushy hard-boiled egg, these films are intermission material at the noon film showings.

During lunch hour, Kodak people see two-reel installments of feature 35mm films (recent ones included *Pajama Game* and *Onionhead*). Between reel changes, the 16mm memos are slipped in to add education to edification. No respecter of rank, the film memos are addressed to all, from cleaning men to top executives.

One of the films for the people at the top was *How to Use a Dictaphone,* showing executives how to dictate properly so that the girls in the steno pool could transcribe with a minimum of errors. For people with a knack of finding things, there is a film on *How to Report a Fire*. This tells the lucky person what to do with one if she finds it; the memo grew out of a case where an employee discovered a fire but did not know how to report it properly. By the time the plant fire protection unit got to it, it had spread. Her delay cancelled the advantage of early detection.

The movie project started in Kodak's industrial engineering section when project engineers, who figure out new ways to do the same old thing, had to figure out how to teach the workers the new methods. Many of them were amateur movie makers and it was a natural step from *How Baby Walks* to *Operating a Sassafrat*.

If there is no one in the department who can handle a movie camera, the department can request a movie from the Photo Service Department. Generally, however, there is someone in every department who can use a camera; all that is required are basic amateur skills plus the necessary materials.

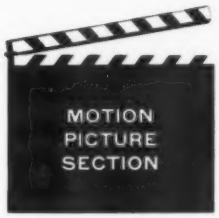
Each department works independently to produce films which they might need for special purposes. Film is purchased from the company at dealer net. Equipment is either privately owned or borrowed from the company. Shooting, editing and recording (using tape recorders) are on a do-it-yourself basis. The result is that the only cost charged is the cost of materials. In one case, this amounted to $39 without computing the six hours it took people in the department to complete the job. If Photo Service had been called in, the cost would have been about 50 per cent higher.

In some cases, however, the cost to the company may be greater than the figure derived from material costs, especially if highly-trained and highly-paid people spend time on the film. Computing costs, however, is a responsibility of the department concerned and they generally work within their budget.

The films are both color and black-and-white, color being preferred when an impression must be made. Virtually all footage is 16mm although 8mm can be used satisfactorily for small groups. The actual running time of a film depends upon the subject. If it is a repetitive operation, viewers lose interest after about 30 seconds. On the other hand, a film explaining office procedures to top management ran 20 minutes, since a variety of operations were involved.

Possibly the severest test of the five-minute movie came in teaching Latvian-born maintenance men, many of whom spoke no English, the proper way to clean and maintain asphalt flooring. A film was made and a Kodak employee who spoke Latvian made a tape recording. According to the company, results were so favorable that the film, with other foreign-language sound tracks, is being used in all Kodak plants. It is doubtful if any other medium could communicate so effectively in a large company.—THE END

FILMS



A motion picture need not always be costly to be cogent. Here are three examples of films which score points on shoestring budgets

BLAST OFF SENDS CUSTOMERS

"My God!" This was the stunned reaction of Galen Fromme, Baltimore TV and radio announcer as he looked up from the script he was narrating to see what the movie footage looked like. What he saw was an eight story apartment building in Washington, D. C. completely demolished by explosives, one of two structures blown up in the heart of the nation's capital to make room for new construction.

This dramatic shot is one of seven which are shown in *Demolition With Controlled Explosives*, a 14-min. sound film in color made by Monumental Films, Baltimore, for Burnbrae, Inc., a contractor.

Burnbrae is a firm specializing in explosives. They wanted a film for promotional purposes which would show people that controlled explosions are not only possible but practical for crowded cities. The film shows successful accomplishment of blasting where structures are demolished without damage to any adjoining property.

Recently, Burnbrae got a contract to fell a five-story building after city officials saw this film. Other jobs are currently being negotiated with the aid of this film. The cost is estimated at $1 a viewer; production costs are not available.

Most of the footage was shot by the contractor, except for one sequence on a West Virginia dam demolition shot by Raymond McKay, photographer for West Virginia University. A Bell & Howell 200EE magazine-load camera with an f/1.9 lens was used. The pictures were shot on Kodachrome.

The narration was written by William F. Hallstead, a Lutherville, Md. free-lance journalist who covers, in addition to other topics, construction stories.

The problem was not subject matter but just selecting the right amount of footage. There is nothing quite so photogenic as a dynamite explosion and Burnbrae had many feet of explosions to choose from.

Editing was done by Max Brecher of Monumental Films who made the decision to show just seven jobs. The sound effects included light music (a Wagnerian effect was rejected as being overdramatic) and some battle sounds were used.

Other sound effects were improvised; a small stick of dynamite was recorded by slamming a studio door. Firing of 200 small charges came from a double-recorded firecracker sound track. An avalanche sound accompanied a building's collapse.

The film also incorporated two stop-motion sequences where each frame is repeated several times to show the sequence of events more clearly. The collapse of the building in Washington was made at a 1:7 ratio, each frame being repeated on seven frames. A demolition of a 300-ft. lock wall in the Monongahela River is at a 1:20 ratio. These sequences were filmed on an Acme Optical camera. Monumental handled this, making the selected number of copies of each frame. Though no substitute for true slow motion, it proved effective.

The film is almost completely devoid of commercialism, the sponsor's name appearing only where his truck is shown as part of a scene. This was so that the film can be used on television as a public service feature.

Perhaps the most unusual aspect is not the film itself but the small size of the firm, five engineers plus laborers as needed. It indicates that large or small, a well-made industrial film is good business.—THE END

LOW BUDGET FILMS CONTINUED ON OVERLEAF ► ► ►

SHORTS MOVE EARTH GIANTS

"We need a short movie to show the new 60-cubic-yard machine to our distributors at the sales meeting. Can you give us one in six weeks?"

Dudley Reed, Jr., Director of Advertising and Public Relations, Marion Power Shovel Co., asked this question after he was told that we might be able to make a low cost movie if he didn't expect "Hollywood" results.

The subject of the proposed movie was to be *The Mountaineer,* then the world's largest shovel.

The photographic department had been shooting movie footage for some time, but it was always turned over to Marion's advertising agency which produced movies for the company. For that reason the company was not very extensively equipped for movie production. Our equipment consisted of a Kodak Cine Special camera, a Bell & Howell 202 Film-o-sound magnetic-optical projector, some rather primitive editing equipment, and a photographic department with practically no experience in movie making.

After obtaining permission to attempt the film, a writer and photographer traveled to the job site and spent two days there, one day picking out vantage points and one day shooting the giant machine. The 800 ft. of color film exposed on the job was processed, and a color work print made by the Calvin Co. While waiting for the return of the work print the titles were filmed and sent off for processing and printing.

After editing the print down to 285 ft., it was sent back to the lab for an answer print with a 100 mil. magnetic stripe.

Mr. Reed suggested that the film would have a more authentic ring if it were narrated by our Vice President instead of hiring a professional narrator. The VP's ad lib comments were recorded on an old tape recorder so that they could later be edited and timed to the film. A pair of 78 rpm turntables were borrowed to play the title and background music, which was purchased from the Boosey and Hawkes, Inc. recorded music library to protect against the possibility of copyright infringement. The turntables and the tape recorder were plugged into the projector, and all was ready for recording on the film.

Since neither the projector nor the tape recorder had synchronous motors, the sounding operation was a hit and miss proposition. It took several trial runs before the narration could be matched with the film.

Primitive but effective

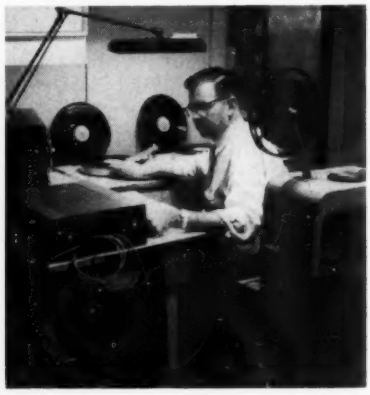
Even in its finished form the film was rather primitive, but it proved to management that a low cost film could be made internally, and paved the way for the purchase of more up-to-date sound and editing equipment.

Since making that first film, *The Mountaineer,* our photographic department has produced three additional movies, each one an improvement over the preceding one.

Our method is in some respects backward from the accepted method of movie making. Due to the difficulty of getting good footage from freelance photographers within our price range, and the great distances that may be involved in finding the desired models doing the particular job that is to be shown, we cannot write a shooting script. Instead, we (*continued on page* 108)

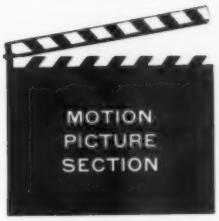
Still of Marion Power Shovel in action indicated company's sampling problem.

Rooftop angle helps isolate subject. Movies are part of full photo coverage.



Staff man doubles in brass as sound engineer to hold down costs of film.

MOVIE SERVICES



The 125 firms listed on the following pages can supply all the highly-trained technical talent necessary to transform your exposed footage into a motion picture. All you need is a camera, raw stock and some good ideas to work with

The 125 firms listed on the following six pages specialize in a unique service. They supply the technical talent needed to turn exposed footage into a motion picture which can tell a story. Their extensive lab facilities and variety of services can make the independent producer almost the equal of a Hollywood genius who has all the resources of a gigantic studio at his command.

It would be wise to write to labs in which you are interested to make sure they offer the exact type of service you need and, to be crass about it, to check prices. The chart is arranged according to region, branch offices being listed in the region in which they are located.

Since movie terminology can be confusing, a guide to service listings, compiled by Bill Kohler, follows.

Production, camera, script

Scriptwriting is like tightrope walking: the easier it looks the harder it is likely to be, and it is supposed to look easy. Since the script determines so much about the film's content, effectiveness and expense, and since very good script writers are rare birds, they can command and justify a large tab for their work.

Narration is distinguished from acting talent in that a narrator normally does not appear on the screen, but in either case the individuals have certain proprietary rights in their persons. These should be taken into account in a contractual agreement with the individuals involved. The jurisdiction of the Screen Actors Guild is widely respected in entertainment circles; important to know if showings to the public are contemplated. SAG wants every person who appears in a film to be or become a member.

As a moviegoer knows, titles can be of every sort, and usually are. A bread and butter type is hot-press titling, done with heated type and pigmented foils in lieu of ink.

Processing

In conducting its survey, PMI found a tendency for all black-and-white processors to do all types of black-and-white processing, and for all color processors to undertake all color processing. The general impression, however, is that this field is somewhat more specialized than this survey would indicate. Some of the firms, being service minded, may be willing to find a processor for your film even if they are not set up to handle it.

Editing, printing, effects

In theatrical films, the editor's job is an exalted one. He is an artist in his own right, and also a technician of the first water. Some in-plant photo groups find that this is a job best handled by an outside expert, particularly if there are some ambitions for the film.

But whether done inside or outside the other services listed in the category as well as some not listed (such as edge numbering of the original 16mm film for quick identification of takes and scenes) are usually required.

Besides price and availability, there's a good deal to know about each of these matters. For example, there are several grades of work prints, and it is up to the editor to decide which is going to do the job. Color work prints may be fully corrected, or hardly corrected at all. The expense of a fully corrected print may be worthwhile, although its price might be double the simplest print. Black-and-white work prints may be "one light" prints where no attempt is made to compensate density changes from scene to scene, or they may be quite elaborate.

Sound services

An interlock is a running of the edited work print and the edited sound track or tracks in synchronization in order to judge the motion picture as a whole.

Many rights are involved in music including those of the composer, the arranger, the musicians, music publishers, etc. Any rights purchased must be specified (television, theatrical, non-theatrical).

Music may be on disc, magnetic tape, magnetic or optical film. Library services may consist of rights to music as so much per selection—or a completely edited score may be offered at a charge per reel.

MOTION PICTURE SECTION

MOVIE SERVICES *(continued)*

NORTHEAST

Alpha Film Laboratories P. O. Box 5325, Baltimore 9, Md.
Audio-Master Corp. 17 E. 45th St., New York 17, N.
Atlas Film Corp. 1111 South Blvd., Oak Park, Ill.
Berk Bay Film Laboratory, Inc. 43 Leon St., Boston 15, Mass.
Bonsey and Hawkes, Inc. 30 W. 57th St., New York 22, N. Y.
Byron Motion Pictures, Inc. 1226 Wisconsin Ave., N.W. Washington 7, D.C.
Capitol Film Laboratories, Inc. 1905 Fairview Ave., N.E. Washington 2, D.C.
C & G Film Effects, Inc. 1600 Broadway, New York 19, N. Y.
Cine Service Laboratories, Inc. 51 Kondazian St. Watertown 72, Mass.
Consolidated Film Industries 221 W. 57 St., New York 19, N. Y.
Corsill-Jacobs Film Music, Inc. 723 Seventh Ave., New York 19, N. Y.
Criterion Film Laboratories, Inc. 33 W. 60th St., New York, N. Y.
Custom Film Laboratory 1780 Broadway, New York 19, N. Y.
Dekko Film Productions, Inc. 126 Dartmouth St., Boston 16, Mass.
Eastern Effects, Inc. 333 W. 52nd St., New York, N. Y.
Eastman Kodak Co. Kodak Processing Lab. Building 6A, Rochester 4, N. Y.
Eastman Kodak Co. 130-35 Rockaway Blvd. Jamaica, N. Y.
Eastman Kodak Co. 16-01 rt. 208, Fairlawn, N. J.

PRODUCTION PHOTOGRAPHY SCRIPTING

- write, produce & distribute entire film
- film location footage
- film studio footage
- scriptwriting
- narration
- acting talent
- titling
- animation footage

PROCESSING

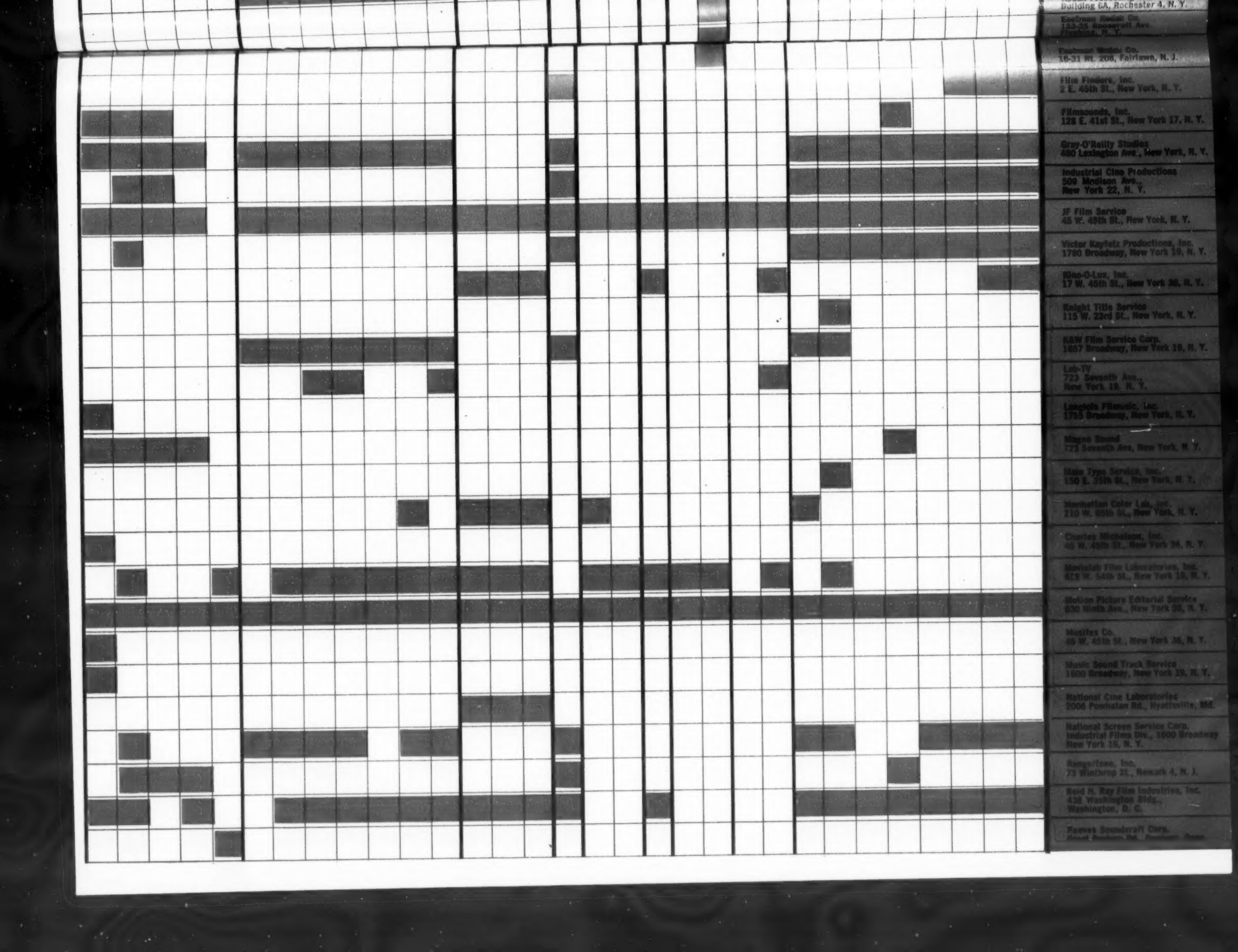
- black & white reversal film — 16MM
- black & white reversal film — 35MM
- reversal color film — 16MM
- reversal color film — 35MM
- black & white negative film 16MM
- color negative film — 16MM
- color negative film — 35MM

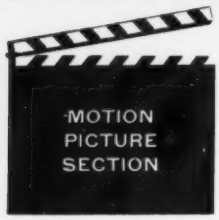
PRINTING EDITING SPECIAL EFFECTS

- editing customers film
- work prints — black & white
- work prints — color
- work prints — black & white from color
- optical printing — 16MM
- optical printing — 35MM
- optical printing — 16MM reduction from 35MM
- optical printing — fades
- optical printing — dissolves
- optical printing — superimposition
- optical printing — other effects

SOUND SERVICES

- magnetic sound striping
- rental of sound studio
- sound recording
- interlock
- music library


Building 6A, Rochester 4, N. Y.
Eastman Kodak Co.
343-55 Roosevelt Ave.
Flushing, N. Y.
Fashion Studio Co.
16-31 Rt. 208, Fairlawn, N. J.
Film Finders, Inc.
2 E. 45th St., New York, N. Y.
Filmsounds, Inc.
128 E. 41st St., New York 17, N. Y.
Gray-O'Reilly Studios
480 Lexington Ave., New York, N. Y.
Industrial Cine Productions
509 Madison Ave.,
New York 22, N. Y.
JF Film Service
45 W. 45th St., New York, N. Y.
Victor Kayfetz Productions, Inc.
1780 Broadway, New York 19, N. Y.
Kino-O-Lux, Inc.
17 W. 45th St., New York 36, N. Y.
Knight Title Service
115 W. 23rd St., New York, N. Y.
KAW Film Service Corp.
1657 Broadway, New York 19, N. Y.
Lab-TV
723 Seventh Ave.,
New York 19, N. Y.
Langlois Filmusic, Inc.
1755 Broadway, New York, N. Y.
Magno Sound
723 Seventh Ave, New York, N. Y.
Main Type Service, Inc.
150 E. 35th St., New York, N. Y.
Manhattan Color Lab, Inc.
210 W. 55th St., New York, N. Y.
Charles Michelson, Inc.
45 W. 45th St., New York 36, N. Y.
Movielab Film Laboratories, Inc.
619 W. 54th St., New York 19, N. Y.
Motion Picture Editorial Service
630 Ninth Ave., New York 36, N. Y.
Musifex Co.
45 W. 45th St., New York 36, N. Y.
Music Sound Track Service
1650 Broadway, New York 19, N. Y.
National Cine Laboratories
2006 Powhatan Rd., Hyattsville, Md.
National Screen Service Corp.
Industrial Films Div., 1600 Broadway
New York 19, N. Y.
Ramsdell, Inc.
73 Winthrop St., Newark 4, N. J.
Reid H. Ray Film Industries, Inc.
438 Washington Bldg.,
Washington, D. C.
Reeves Soundcraft Corp.



MOVIE SERVICES *(continued)*

			NORTHEAST cont.														SOUTHEAST				
			Ross-Gaffney, Inc. 45 W. 45th St., New York, N. Y.	Lawrence F. Sherman & Assoc. 630 Ninth Ave., New York 36, N. Y.	Sound Masters, Inc. 165 W. 46th St., New York 36, N. Y.	Sound Motion Pictures 337 Main St., Binghamton, N. Y.	Swift Motion Picture Laboratories, Inc. 1183 University Ave. New York 52, N. Y.	Talemated Motion Pictures 415 Lexington Ave. New York 17, N. Y.	Tiltra Sound Corp. 1600 Broadway, New York, N. Y.	Trans-Lux Distributing Corp. 625 Madison Ave., New York, N. Y.	TransFilm-Caravel, Inc. 35 W. 45th St., New York 36, N. Y.	U. S. Photographic Equipment Corp. 442 Rogers Ave., Brooklyn, N. Y.	Thomas J. Valentino 150 W. 46th St., New York 36, N. Y.	Vicom, Inc. 800 Linden Ave., Rochester 11, N. Y.	Videart, Inc. 343 Lexington Ave. New York 16, N. Y.	Frederick F. Watson, Inc. 202 E. 44th St., New York 17, N. Y.	Zoon Film Labs 3042 Greenmount Ave. Baltimore 18, Md.	Agrafilms, Inc. Jefferson Rd., Athens, Ga.	Byron Motion Pictures, Inc. 1220 E. Colonial Dr. Orlando, Fla.	Charles D. Bealand Co. [illegible]	Motion Picture Labs., Inc. 761 S. Main, Memphis 2, Tenn.	Southeastern Film Processing Co.
PRODUCTION PHOTOGRAPHY SCRIPTING	write, produce & distribute entire film																				
	film location footage																				
	film studio footage																				
	scriptwriting																				
	narration																				
	acting talent																				
	titling																				
	animation footage																				
PROCESSING	black & white reversal film	16MM																			
		35MM																			
	reversal color film	16MM																			
		35MM																			
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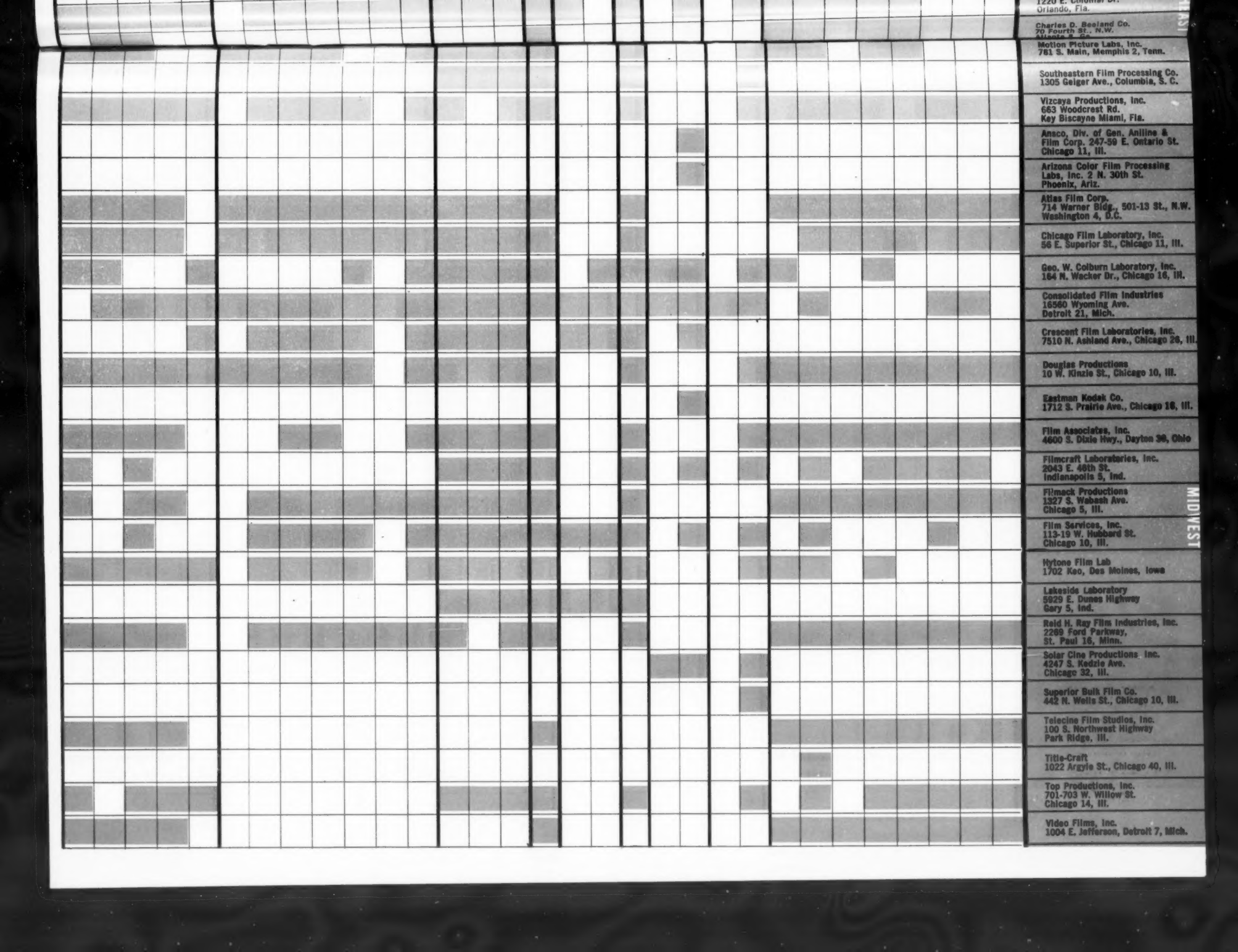
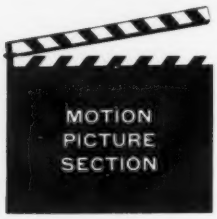
		other effects																			
SOUND SERVICES	magnetic sound striping																				
	rental of sound studio																				
	sound recording																				
	interlock																				
	music library																				


1220 E. Colonial Dr.
Orlando, Fla.
Charles D. Beeland Co.
70 Fourth St., N.W.
Motion Picture Labs, Inc.
761 S. Main, Memphis 2, Tenn.
Southeastern Film Processing Co.
1305 Geiger Ave., Columbia, S. C.
Vizcaya Productions, Inc.
663 Woodcrest Rd.
Key Biscayne Miami, Fla.
Ansco, Div. of Gen. Aniline & Film Corp. 247-59 E. Ontario St.
Chicago 11, Ill.
Arizona Color Film Processing Labs, Inc. 2 N. 30th St.
Phoenix, Ariz.
Atlas Film Corp.
714 Warner Bldg., 501-13 St., N.W.
Washington 4, D.C.
Chicago Film Laboratory, Inc.
56 E. Superior St., Chicago 11, Ill.
Geo. W. Colburn Laboratory, Inc.
164 N. Wacker Dr., Chicago 16, Ill.
Consolidated Film Industries
16560 Wyoming Ave.
Detroit 21, Mich.
Crescent Film Laboratories, Inc.
7510 N. Ashland Ave., Chicago 26, Ill.
Douglas Productions
10 W. Kinzie St., Chicago 10, Ill.
Eastman Kodak Co.
1712 S. Prairie Ave., Chicago 16, Ill.
Film Associates, Inc.
4600 S. Dixie Hwy., Dayton 36, Ohio
Filmcraft Laboratories, Inc.
2043 E. 46th St.
Indianapolis 5, Ind.
Filmack Productions
1327 S. Wabash Ave.
Chicago 5, Ill.
Film Services, Inc.
113-19 W. Hubbard St.
Chicago 10, Ill.
Hytone Film Lab
1702 Keo, Des Moines, Iowa
Lakeside Laboratory
5929 E. Dunes Highway
Gary 5, Ind.
Reid H. Ray Film Industries, Inc.
2269 Ford Parkway,
St. Paul 16, Minn.
Solar Cine Productions Inc.
4247 S. Kedzie Ave.
Chicago 32, Ill.
Superior Bulk Film Co.
442 N. Wells St., Chicago 10, Ill.
Telecine Film Studios, Inc.
100 S. Northwest Highway
Park Ridge, Ill.
Title-Craft
1022 Argyle St., Chicago 40, Ill.
Top Productions, Inc.
701-703 W. Willow St.
Chicago 14, Ill.
Video Films, Inc.
1004 E. Jefferson, Detroit 7, Mich.
MIDWEST



MOVIE SERVICES *(continued)*

SOUTHWEST

- Calvin Productions, 1105 Truman Rd., Kansas City 6, Mo.
- Big D Film Laboratory, Inc., 4215 Gaston Plaza, Dallas, Texas
- General Film Laboratories, 105 W. 13th St., Kansas City 5, Mo.
- Ideas Illustrated, Inc., 2309 R. Haskell Ave., Dallas 4, Texas
- Jamieson Film Co., 3825 Bryan St., Dallas, Texas
- Reid H. Ray Film Industries, Inc., 1627 Main St., Kansas City, Mo.
- Southwest Film Laboratory, Inc., 3024 Ft. Worth Ave., Dallas 11, Texas
- Texas Industrial Film Co., Inc., 2938 North Blvd., Houston, Texas
- Acme Film Laboratories, Inc., 1161 N. Highland Ave., Hollywood 38, Calif.
- Lee Bailey Productions, 7934 Santa Monica Blvd., Hollywood 46, Calif.
- Marvin Becker Films, 815 Howard St., San Francisco 3, Calif.
- Capitol Records, Library Services, Hollywood & Vine Sts., Hollywood, Calif.
- Cinema Research Corp., 716 N. La Brea Ave., Hollywood 38, Calif.
- Cinesound Co., 1037 N. La Brea Ave., Hollywood 38, Calif.
- Consolidated Film Industries, [illegible] Seward St., Hollywood [illegible], Calif.
- [illegible] Co., 1017 N. La Brea Ave., Hollywood 38, Calif.
- [illegible] Productions, Inc., [illegible] Hollywood 38, Calif.
- Film Effects of Hollywood, Inc., [illegible]

PRODUCTION
- SCRIPTING
  - write, produce & distribute entire film
- PHOTOGRAPHY
  - film location footage
  - film studio footage
- SCRIPTING
  - scriptwriting
- PHOTOGRAPHY
  - narration
  - acting talent
  - titling
  - animation footage

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  - 35MM
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    - color
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    - superimposition
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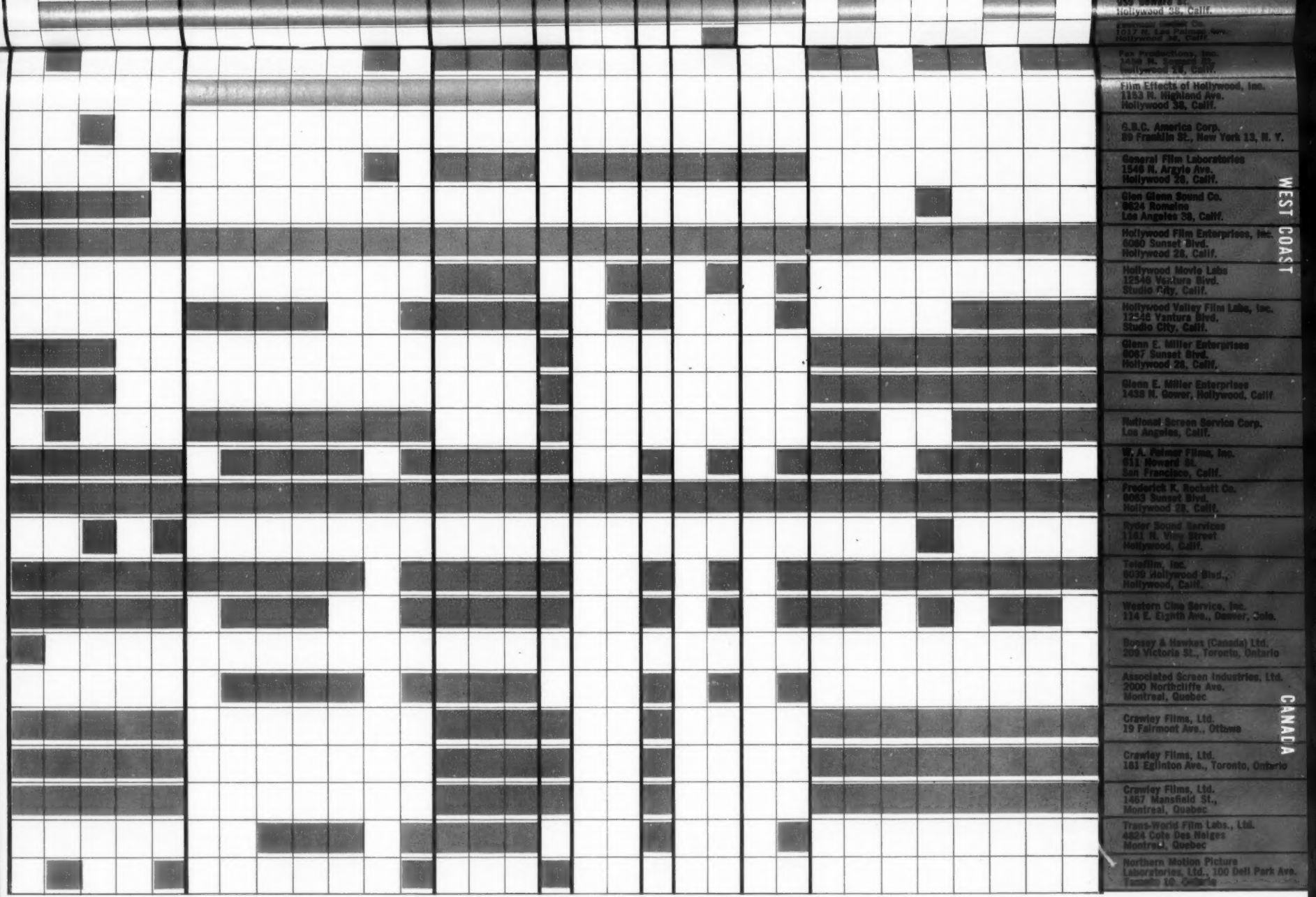
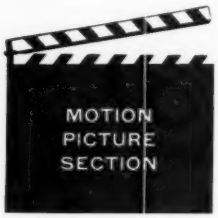

Hollywood 38, Calif.
Fax Productions, Inc.
1438 N. Gower St.
Hollywood 28, Calif.
Film Effects of Hollywood, Inc.
1153 N. Highland Ave.
Hollywood 38, Calif.
G.B.C. America Corp.
59 Franklin St., New York 13, N. Y.
General Film Laboratories
1546 N. Argyle Ave.
Hollywood 28, Calif.
Glen Glenn Sound Co.
6624 Romaine
Los Angeles 38, Calif.
Hollywood Film Enterprises, Inc.
6060 Sunset Blvd.
Hollywood 28, Calif.
Hollywood Movie Labs
12348 Ventura Blvd.
Studio City, Calif.
Hollywood Valley Film Labs, Inc.
12348 Ventura Blvd.
Studio City, Calif.
Glenn E. Miller Enterprises
6067 Sunset Blvd.
Hollywood 28, Calif.
Glenn E. Miller Enterprises
1438 N. Gower, Hollywood, Calif.
National Screen Service Corp.
Los Angeles, Calif.
W. A. Palmer Films, Inc.
611 Howard St.
San Francisco, Calif.
Frederick K. Rockett Co.
6063 Sunset Blvd.
Hollywood 28, Calif.
Ryder Sound Services
1161 N. Vine Street
Hollywood, Calif.
Telefilm, Inc.
6039 Hollywood Blvd.,
Hollywood, Calif.
Western Cine Service, Inc.
114 E. Eighth Ave., Denver, Colo.
WEST COAST
Bonnay & Hawkes (Canada) Ltd.
209 Victoria St., Toronto, Ontario
Associated Screen Industries, Ltd.
2000 Northcliffe Ave.
Montreal, Quebec
Crawley Films, Ltd.
19 Fairmont Ave., Ottawa
Crawley Films, Ltd.
181 Eglinton Ave., Toronto, Ontario
Crawley Films, Ltd.
1467 Mansfield St.,
Montreal, Quebec
Trans-World Film Labs., Ltd.
4824 Cote Des Neiges
Montreal, Quebec
Northern Motion Picture
Laboratories, Ltd., 100 Dell Park Ave.
CANADA

Rx PHOTOGRAPHY



A doctor at a medical movie is perhaps the toughest critic in the world, demanding ethical conformity, accuracy and pictorial interest. This difficult prescription is ably filled by Sturgis-Grant using careful planning, long experience and superb photographic ability

The attending physician examined the just born infant. Its color was slightly bluish, the muscles flaccid, heartbeat irregular, and there was no response to the simulation which should produce the lusty cry for life. Quickly the doctor carried the baby to a table set up in a corner of the delivery room, nodding as he did so to a white-clad movie photographer standing there.

Racing the second hand, the doctor applied his skill to revive the life which was almost ended. As the doctor worked swiftly, every action was recorded by the movie cameraman. Finally, within a few minutes, the infant was crying and breathing normally, indignant at his arrival into a new and not yet friendly world.

The tiny patient was a case of neonatal asphyxia, the result of an inability to begin spontaneous breathing, and leading to permanent damage or death from lack of oxygen, if not corrected within minutes. This is one major cause of infant mortality and the doctor must be prepared to apply the basic, proven techniques of resuscitation deftly and effectively. Thanks to the film record, young doctors will be able to see these methods clearly and learn them more quickly, for the cameraman was from Sturgis-Grant Productions, getting footage for a film on *Resuscitation of the Newborn.* This is one of a series of Smith Kline and French Teaching Films designed for the medical profession. Two others have been released so far, one of which, *Human Gastric Function,* was also made by Sturgis-Grant. Plans now call for the release of two films a year.

This firm is one of a handful of professional movie makers who specialize in medical films, movies and slide films covering various aspects of medicine. While Sturgis-Grant is not exclusively a producer of such films, they account for a considerable portion of the medical footage turned out annually.

The films they produce range from sales promotion material for drug companies to clinical studies for research and medical training. Regardless of the purpose, these films have two important characteristics—technical excellence and medical authenticity. Both are important and share responsibility for the success of the company, founded in 1948 by Warren Sturgis and Dwinell Grant.

Warren Sturgis, a Boston boy whose background includes Groton, Harvard and Harvard Medical School, comes from a family of doctors. After two years of medical school, however, he decided that the practice of medicine was not for him, and he should look around for some other profession. His brother, a doctor, put Warren in touch with Mac Schwab, a medical photographer then doing a film at Massachusetts General Hospital.

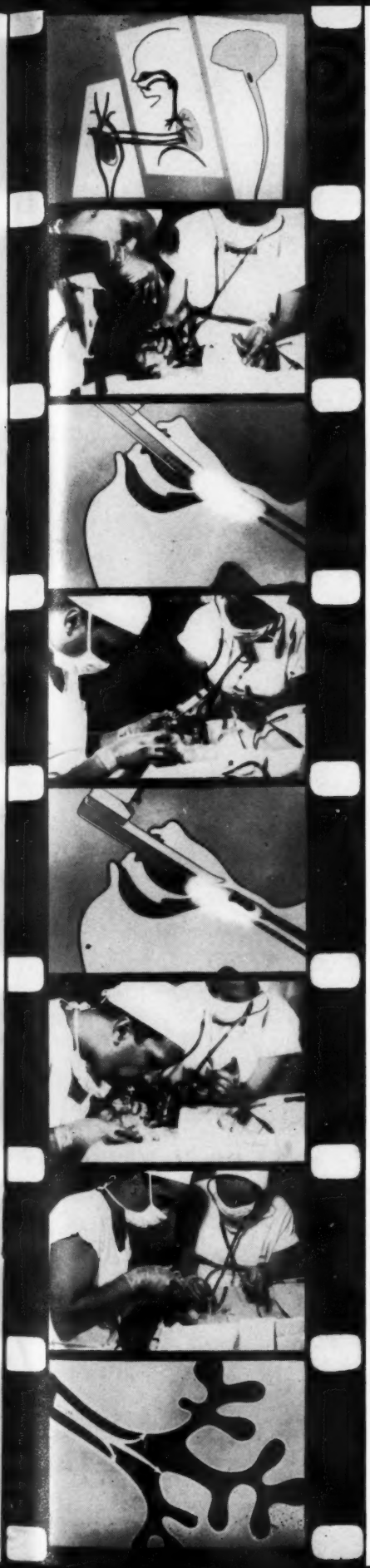
This job suited Warren's inclinations perfectly, since he had become an avid amateur movie maker some ten years before, when an uncle left a movie camera at the house and Warren was the only one to learn to use it. Like many other professionals, Sturgis traces his entry into the field from the virus planted by that first movie camera, a Bell & Howell Filmo-A.

From then on, 1938, he has been in medical photography. One of his first lessons was not to underestimate the value of one's services. Sturgis tells how his initial film, *Education of the Diabetic Patient,* was made with Schwab for one of the leading specialists in the field, who asked at the outset how much the film would cost. After some thought, mentally adding up the cost of stock and lab fees, Sturgis asked if $75 would be all right, not wishing to make the cost a burden on the doctor.

After a series of mishaps, including theft of one camera and loss of some negative by the lab the edited, 400-ft., 16mm film was finally delivered. When the check arrived, it was not from the doctor who had ordered the job but from one of the largest life insurance companies in the country. The moral for any working cameraman is clear.

Other training included production work on *The March of Time,* a monthly news and documentary series of Time, Inc., and wartime service with the Navy's Bureau of Medicine and Surgery in charge of the movie lab of the Naval Medical Center, Bethesda, Md.

The Grant of Sturgis-Grant is Dwinell Grant, who is no longer active in the firm but who still does considerable writing and animation for them, assignments which included the script and artwork



courtesy of Smith Kline & French

for *Resuscitation of the Newborn.*

The road from idea to screening of a film may have various starting points. Sometimes a sponsor (one who pays for a film) may come to Sturgis-Grant with an idea. Sometimes a doctor who has an idea for a film comes to the producer and asks him to find a sponsor. In the case of the resuscitation film, the idea was conceived by the New York County Medical Society and Sturgis-Grant found the sponsor, Smith Kline and French, after a two-year search.

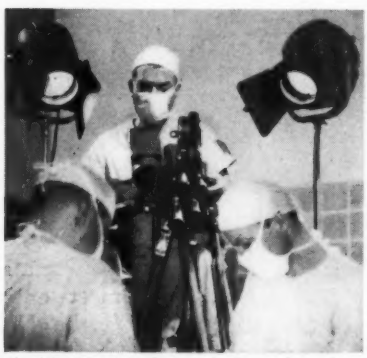
Each film has a technical adviser, a doctor who is responsible for seeing that it is factually accurate and not in violation of medical ethics. Maintaining this line between the scientific viewpoint and effective story presentation is one of the major problems faced by medical film producers. Very often the technical director will want to include a great number of details which make for a scientifically accurate but a cinematographically dull, overly-long movie.

The visual effectiveness of a film is important, since it is only through the presentation of a good film that a sponsor can hope to recoup the cost of the production. These costs vary, depending often upon the degree and complexity of the animation involved. A simple film without animation, say of a single surgical procedure, may cost from $125 to $250 per screen minute. A film of about 20 minutes running time with six or seven minutes of animation may cost $1000 a minute while a completely animated film may hit $1500 a minute or more.

Costs are figured on the basis of an hourly rate for production and administration time to which has been added a percentage for mark-up.

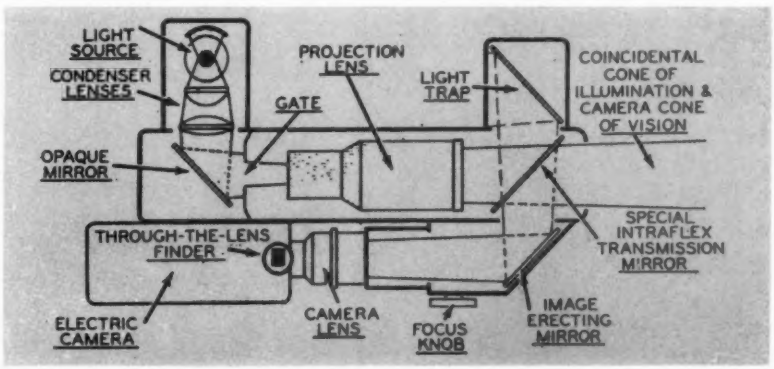
In connection with company finances, Warren Sturgis feels that it is better to maintain a good reputation with the medical profession than to try to make the highest possible profit by turning out film which may have questionable value. As part of good will, Sturgis-Grant frequently does extra work which might add to the quality of the completed film without any charge.

(*continued on page* 85)



Modified Cine-Special II with 4-lens turret covers operation from one spot

Warren Sturgis shoots operation using Intraflex camera ***(see diagram below)***



Intraflex lighting is shadowless, coaxial with camera optics

ANGUTI AT LARGE

No casual roamer is Mike Anguti, photo ace from Socony Mobil, but one assignment took him from East to West Venezuela, where he shot 100 pictures a day for 38 days in this oil-rich republic. He lost eight pounds despite the fact that he moved-about on a Flying Red Horse DC-3

Bentonite clay drilling mud

A bit more than a year ago, Socony Mobil's Photo Chief, Mike Anguti, checked in at a New York airport with an assignment in his pocket that read like an industrial photographer's dream: photograph the entire operation of S M's Venezuelan affiliate, Mobil Oil Company de Venezuela.

To keep his feet on the ground, company PR men had filled in a tight 38-day shooting schedule for Anguti that left few stones unturned. The purpose of the assignment was two-fold. First to furnish the nucleus for a picture library for a newly formed public relations office in Caracas, to be staffed almost entirely by Venezuelans. Second to furnish the New York headquarters picture library with material on the fast growing Venezuelan operation. The use of pictures in Caracas was suggested by their success in the American firm. In order that negative files could be kept in both places, Anguti's orders were to shoot two of everything.

Once in Venezuela, he moved by company DC-3, jeep and on foot, covering something close to 1500 miles of ground with 135 lbs. of photographic equipment. This took him from the oil fields around Anaco in Eastern Venezuela to jungle areas near Barinas in the West, as well as to the fast growing capital, Caracas, on the Caribbean coast in the north.

The schedule covered November and December which is winter in this part of South America by

Roughneck or ayudante de perforador twists pipe with chain cinch

the calendar, daily temperatures which hovered near 100°F notwithstanding.

Anticipating hot weather troubles, Anguti left his film purchasing till last, and made sure he got the freshest stock he could lay his hands on. In Venezuela he was nearly always able to find refrigerator space for both raw and exposed film. No problems.

A photographer with a big assignment in an unfamiliar place is in his glory, and Anguti loved it. But a trip like this is no joy ride. There was work to do from dawn to dusk, and thereafter, Sundays and holidays included. Anguti worked off 8 lbs. from his already trim frame.

Language in Spanish-speaking Venezuela posed little problem for Anguti, because his night-school Italian permitted him to understand what was said, and to make himself clear. Latin-Americans are a friendly people, Anguti feels, but this is no guarantee that they will take kindly to the representative of a large United States company. There's a code of manners to be observed in the rough-and-ready oil fields, as well as during after hours pool and beer sessions.

In taking pictures, Anguti found that the best way to enlist cooperation was to make clear the significance of the picture itself, as well as the subject. After all, Anguti says, the subject is as important to the picture's being a success as the photographer. The explanation worked and Anguti got cooperation; sometimes it was a bit overenthusiastic, in fact. He wanted a hand in a shot to add interest to a picture of drilling mud—an important drilling lubricant, heat dissipator, oil shaft liner and medium for removing chunks of drilled material—which is imported from the United States. Five hands got in the act and Anguti had to crop his Rollei negative closely to get the effect he wanted. Another shot on the timetable was a somewhat unpredictable event in oil drilling that occurs only once in the course of bringing a well to production. The Venezuelan *perforador* in charge knew Anguti had been anticipating it for two weeks, so when it came at 5 a.m. on a Sunday morning, he sent an assistant to Anguti's bunk to shake him awake. The shot is one of the

Machete-made clearing frames Anaco oil rig in the sunset

The makings of an oil well

Mobil-trained Venezuelan driller

most widely used in the entire series.

Anguti's equipment for the trip included cameras with formats from 16mm to 4 x 5 in. A 2.8 Rollei was loaded with Ektachrome E2. A 3.5 Rollei was stocked with Verichrome Pan. Anguti shot stock motion picture footage on Commercial Ektachrome with a Bell & Howell 70DA. His 35mm bag included a Canon with which he shot Kodachrome and a Pentax he loaded with Plus-X. He shot Anscochrome in holders, and Verichrome-Pan in filmpack with a Speed Graphic equipped with a variety of lenses.

A 150mm Kilfitt on the 35 was the workhorse for tight shots of dangerous drilling operations where a cameraman too close could be a hazard.

Although Anguti's creative standards are high—he was the rare industrial photographer whose work was exhibited as fine art by the Metropolitan Museum—an oil field is no place for a temperamental prima donna. When the safety engineer says no, Anguti doesn't argue.

In all Anguti exposed about 3500 frames of stills and 1000 ft. of motion picture footage. All the stills were contact printed, and from them the company selected about 514 negatives for United States use and approximately the same number for the Caracas files.

Anguti estimates that about 5000 prints have been made from the North American set to supply public relations requests. Strikingly displayed 16 x 20's are used to explain operations to visitors in the Caracas headquarters; 280 display prints have been made for this purpose. Anguti brought the exposed film back with him and rushed the processing with the help of a custom lab.

A successful portion of the library from the public relations point of view consists of Anguti's coverage of the extensive training program conducted by the firm. It enables Venezuelans to qualify for highly skilled jobs in oil exploration, drilling and research. Because this is no ordinary schoolroom training, Anguti saw more pictures in it than did the shooting script. The action and appeal he injected into these shots won them prominence in the collection, and drew compliments from PR.

It has been almost impossible to keep track of the use of pictures from this project. But they have been printed in publications throughout the Western Hemisphere. A recent addition to Anguti's stock of clippings on the subject is a book for children from 8 to 12 years old, called *Behind the Scenes in an Oil Field*. The bulk of its illustrative material was taken, with Socony Mobil blessing, from Anguti's Venezuelan project.—THE END

The answer is—give your laboratory time and money to do the job right! Then all your release prints will be on the beam 100%.
It shouldn't happen to a dog!
EASTMAN KODAK COMPANY
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Always shoot it on EASTMAN FILM
You'll be glad you did!

LASSIE, a Peabody Award winner, is produced by Robert Golden for The Jack Wrather Organization; Sherman A. Harris, Executive Producer.

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It *didn't* happen to this dog!

LASSIE, like many other top-rated filmed TV shows, is processed by **Consolidated Film Industries.** And at CFI, it soon becomes apparent that 40 years of experience and know-how make an important difference.

There is no such thing as a "cut rate" or "bargain" in laboratory film processing. The **Eastman Kodak Company** says "The answer is—give your laboratory time and money to do the job right! Then all your release prints will be on the beam 100%."

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MEMO ON:

MONEY

How much is a photographer worth? Civil Service pay scales offer clues to this most secret of trade secrets

No secret of atomic missiles was ever guarded as zealously as pay scales are guarded by private industry. Presumably, what a company thinks a man is worth is a secret between the man and the chairman of the board, shared only by about 5000 people in the personnel department.

Actually, there are various good reasons for this state of affairs, most of which are familiar to anyone in industry, especially photographers. We know of cases where two men with approximately the same abilities and responsibilities draw salaries which are, to say the least, unequal. In fact, they do not even come close to each other. To compare notes could cause a minor revolution.

Since photographers are both curious and friendly, some note-comparison on money matters takes place but on a very quiet level. However, there is one area where salaries are not only discussed but advertised. This is the much maligned field of civil service where pay scales and job requirements tend to be standardized rather rigidly. Actually, these salaries are nothing to brag about, running about 10 per cent to 20 per cent below comparable industrial pay levels. However, they do give some idea of why working industrial photographers seldom get rich.

Federal civil service pay scales are graded with a GS rating, from 1 to 15. Since GS-15 (which pays about $12,500) is the civilian equivalent of a General, a rank to which few photographers are promoted, we will concentrate on photographic grades. Most of these are between GS-3 ($3,495 per year) to GS-9 ($5,985 per year). The listed pay is base pay; there are annual increments in each grade until a maximum for the grade is reached.

The grades available at any agency or installation vary according to a T/O similar to that in the Army which kept so many Pfc's from becoming Master Sergeants. While the grades available may vary, the pay scale of every grade is the same and the general qualifications similar. What happens as photographers get experience in both photography and Civil Service is a certain amount of switching from job to job within the government.

For example. A GS-7 may be eligible for a higher grade, say GS-9, but there is no vacancy to which he can be promoted. Without the vacancy, there can be no promotion, unless the section chief or similar supervisor can get a change in the T/O. If there is an impasse—no vacancy, no promotion, no change in T/O, the photographer makes extremely discreet inquiries.

There may be an agency across the street which has a GS-9 slot open. The trick is now to get a transfer which may take time but which can be done.

With today's tight labor market, there is a certain amount of raiding between agencies but every effort is made to keep it as gentlemanly as possible. The biggest raider in civil service is not other agencies but private industry which can offer fabulous (by government standards) salaries.

It might be interesting to see what the government wants and how much they pay for it. This information was taken from one installation but reliable informants assure us that there is no appreciable variation in requirements, which apply to both still and movie photographers.

A beginner with one year of experience (amateur experience can be credited toward the one year requirement, as can schooling up to two years), at least six months of which is in the optional field (still or movie) can get $3,495 as a GS-3. For two years experience, a photographer can get a GS-4 ($3,755).

For GS-5 ($4,040), the applicant must have had at least three years experience including the ability to perform difficult photo assignments without direct supervision. Three-and-a-half years experience is good for a GS-6 ($4,490). This is the first level at which supervisory experience is mentioned. The requirement includes two years experience in the option (special field) for which the photographer is applying still, movie or process work.

GS-7 (04,980), GS-8 ($5,470) and GS-9 ($5,985) require from four to five years experience plus some experience in supervision,

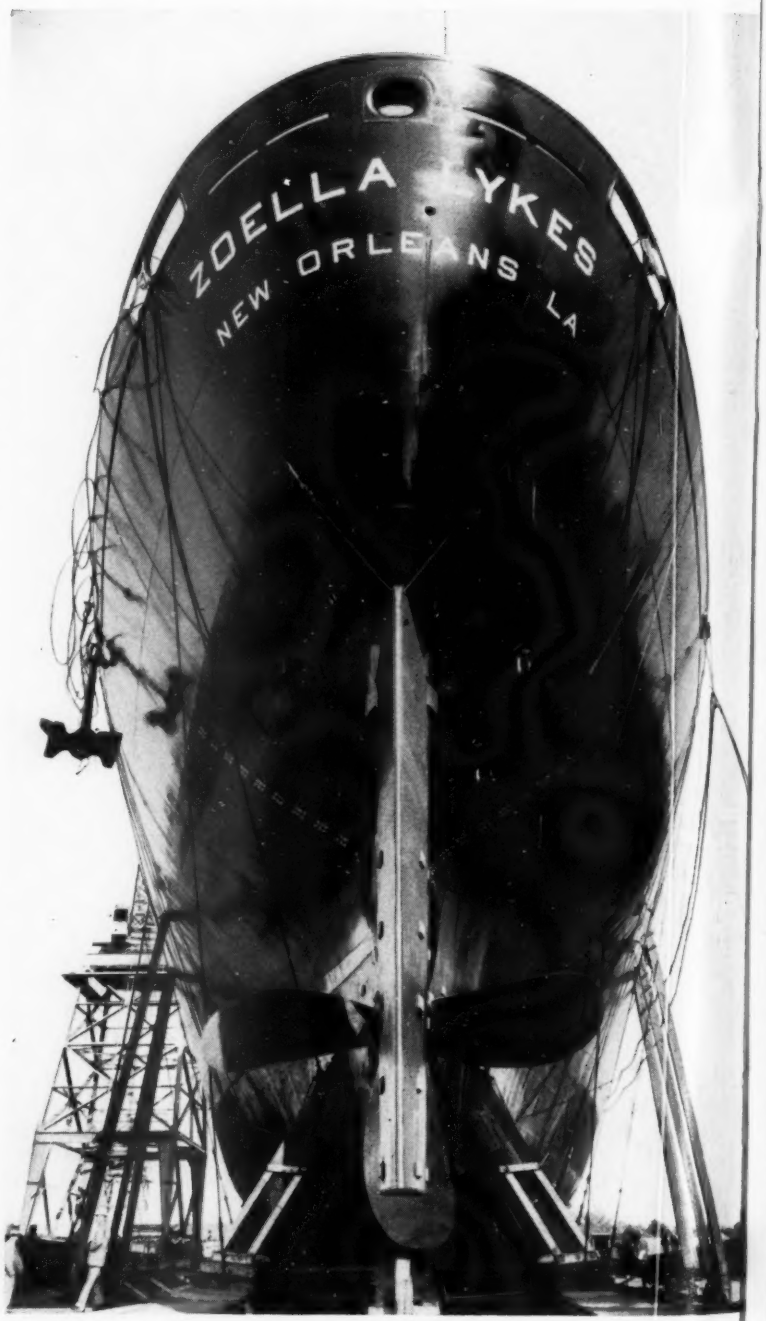
(*continued on page* 106)

PMI's Monthly

READERS' SHOWCASE

This month's Readers' Showcase presents four more samples from on-the-job photographers covering a wide selection of subjects from diverse geographical locations—insect fossil in Montana, ship-building in Mississippi, laboratory in Maryland and automotive parts warehouse in Michigan.

From time to time we have asked for even more specialized and unusual subjects—metallographs, photomicrographs, stress studied—and we got them. Last month we departed somewhat from our regular format and threw the spotlight on a single picture along with its explanatory shot, proving the proverb about a picture being worth more than a thousand words. This month we are making modest request that might threaten to inundate this department with a flood of pictures. We want to see some outstanding product and advertising shots. We recently ran across a photo-section chief who told us that his department is being used to provide a portion of the pictures for the Company's national advertising campaign as part of the daily routine of his department. We suspect that a great many companies are following this practice. If we are right in this assumption we want to view the results. So walk, don't run to the nearest mailbox and start them coming. The section below gives the necessary particulars.



You are invited to send in your pictures. Here are the details:

There are two rewards for each of the pictures chosen. The first is knowing that your picture will be seen by appreciative fellow professionals. The second is $10.00. Please include your name and your company's name, a note about the picture and how it was used, and the technical data. Send them to SHOWCASE, PMI, 33 W. 60, New York 23, N. Y. Don't forget to include a stamped, self-addressed envelope, otherwise pictures cannot be returned.

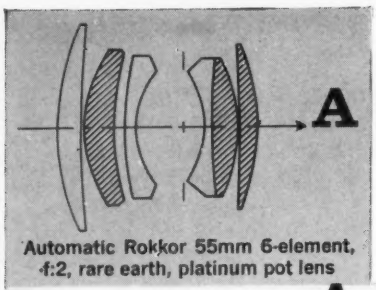
PETER WINKLER, Baltimore, Md., photographer used a 4 x 5 camera to make this arresting picture in a chemistry laboratory. The large negative captured a high degree of fine detail and what appears to be a genie as well — lending a touch of humor to the picture.

ROBERT PACKO, Toledo, Ohio, Commercial photographer, made this picture as part of an assignment on the warehousing

operation of AP Parts Corporation. He used a Kodak 4 x 5 Master View, 90mm Super Angulon lens. Multiple flash from No. 5 bulbs exposed Ansco's Super Hypan film, open flash at f/.32.

HENRY P. ZUIDEMA, photographer with the Jam Handy Organization, wanted to photograph insect fossils imbedded in fine-grained shale in western Montana. Low contrast and small size (less than 3/16-in.) created problems. A Leitz photocopy set-up with 50mm Elmar lens, Kodak Microfile film and two 25-watt bulbs placed at about 45° angles to the subject did the trick.

NOEL S. DAVIS, photographer for Ingalls Shipbuilding Corp., Pascagoula, Miss., made this picture of the stern of the "Zoella Lykes" for the company's engineering dept. files. Crown Graphic 4x5 camera, 90mm Optar lens, Ansco Superpan Press sheet film exposed for 1/100 sec at f/.16.



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Here's a new f:2 lens in the famous Rokkor tradition...with corner to corner sharpness. Here's Minolta-precision in every important feature serious photography demands. Fully automatic diaphragm with lock-in half-stops, instant return mirror, double-bright fresnel viewing system, hushed focal plane shutter with 12 click-in speeds from B to 1/500th, magnified counter, automatic zero return, built-in bypass on the self-timer, rapid rewind, separate FP and X terminals, flick-in bayonet lens mount.

And for every professional application, there's a Minolta lens or accessory to do the job...a complete system of photography.

A professional camera like this at $179.50 is possible only because Minolta makes the rare earth, platinum pot lenses from beginning to end. They design them, actually make their own glass, grind, polish, coat, mount, and assemble them. That's why Minolta is seldom matched in quality...never matched in price!

Your choice of 9 lenses

Standard: Auto Rokkor 55 mm, f:2, with camera; **Wide Angle:** Auto Rokkor 35 mm, f:2.8, $119.50; **Telephoto:** Rokkor 100 mm, f:4, $59.50; Auto Rokkor 100 mm, f:3.5, $99.50; Rokkor 135 mm, f:4, $69.50; Auto Rokkor 135 mm, f:2.8, $139.50; Rokkor 200 mm, f:3.5, $179.50; Rokkor 250 mm, f:4, $215; Rokkor 600 mm, f:5.6, $550.

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Angle Finder, $14.95 • Extension Tube Set, $19.95 • Lens Hood, $5.95 • Copying Stand, $49.50 • Critical Focusing Eyepiece, $14.00 • Filters, $6.95 • Leica or Exacta Mount Adapter, $4.95 ea. • Polarizing Filter, $19.95 • Soft or Hard Leather Case, $15.00 • Cable Release, $1.95 • Neck Strap, $2.95 • Accessory Clip, $1.95 • Extension Bellows, $24.95 • Microscope Adapter, $19.95. (Additional accessories available soon.)

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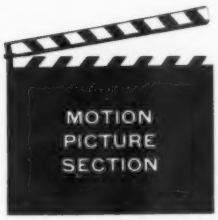
IAVA's PRODUCTION WORKSHOP



Industrial audio-visual communicators get together in Los Angeles to compare notes. Here's a rundown of their brainstorming by Ernest E. Reshovsky

IAVA stands for Industrial Audio-Visual Association, a group whose membership is limited at present to 100 men, exclusively from business and industry, actively engaged in the field of audio-visual communication. It was founded in 1946 "to study the creation, planning, production, distribution, presentation and evaluation of all media and methods of A-V communications; to promote better standards and equipment in the A-V field; and to establish high ethics in the relations of members with associated interests."

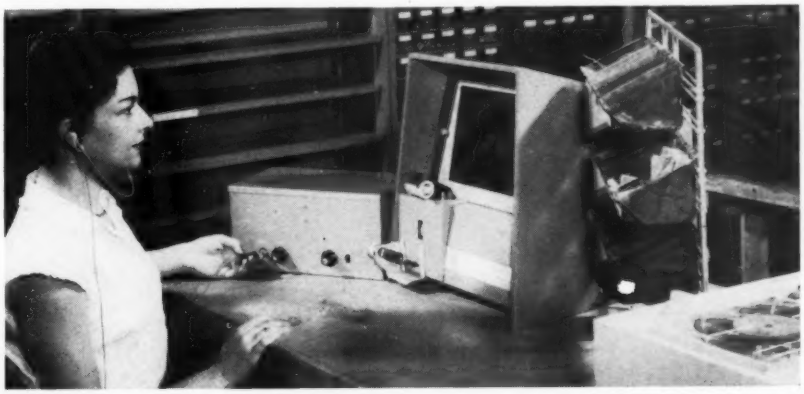
Some of the highlights of the 1960 IAVA worshop sessions in Los Angeles, January 26-28, were:

"COMMUNICATING WITH FILM" presented by Robert S. Scott, Film Administrator of Douglas Aircraft Company. Scott explained that the vacuum created in our minds by the fast moving events of the Air Age, the Jet Age, the Atomic Age and the Space Age must be filled with truth and honest information lest someone else will fill it with half-truth and propaganda.

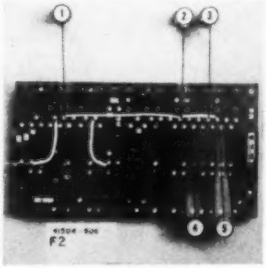
He continued: "Our communicating medium itself is a highly developed synthesis—a montage of many arts and sciences, old and new—brought together to provide a maximum over-all impact upon a captive audience. Word and picture, sound effect and music—imaginative and flexible animation in any choice of color. High-speed, microscopic, telescopic, zoom and remote—the camera's eye can go where we cannot go and see what we can't see—and can live forever to tell about it in the future. What can we do then to advance the state of our art? We should try hard to use the full potential of our medium and direct it accurately to fill that vacuum in our conscious understanding. We should respect the economy of our art. Not one decibel too little—nor one frame more than is needed to get the message through. It isn't just the money. The total time and energy involved, our own, and that of the audience must be honestly considered. We don't have time anymore to appeal just to the emotions. "Documentary" means "to teach the mind." To fulfill this purpose takes much less time, less money—but a lot more thought.

"THE FACTORY COACH" was a lecture-demonstration by A. White, Manufacturing Engineer, Autonetics, Division of North American Aviation, Inc. He showed a four-minute movie of an A-V method developed to teach and supervise workers in the assembly of complex electronic devices. Basically *Factory Coach* consisted of an A-V projector-viewer placed in front of the assembler who is equipped with a head set synchronized to the projector-viewer. Precise directions are given for each assembly step by means of audio command, backed up by a color photograph or simplified diagram on the screen. White explained that to test the system, an assembly with a manufacturing time standard of about five hours was chosen—a standard to be attained by the average operator only after assembling fifteen units. To establish the system an intensive method analysis had to be made for the most efficient way of assembling a unit. The work was divided into easy steps. Each step was photographed and made into a filmstrip, synchronized with oral instructions. The time following instructions was filled with music (which the operator can silence, if he wishes) for the work period allowed. In summation, White surprised his audience by reporting that instead of fifteen assemblies only

(*continued on page* 101)



Factory Coach is a mechanized teacher for complex assembly jobs. Pretty pupil *(above)* hooks herself in at beginning of a five-hour session with the magentic-tape-and-filmstrip training aid. Sample of what it tells is shown below.



VISUAL

		Work Element (Decimal Minutes)
1.	a. Select wire - tray No. 3, and hook from pin No. 1 to 2.	.99
	b. Tin both ends of wire.	.00
2.	Select sleeving from tray No. 1, cut two lengths each 1/2" long.	.33
3.	Hook buss wire tray No. 2 from pin No. 2 sleeve to pin No. 3.	.73
4.	Hook buss wire from pin No. 4 sleeve to pin No. 5.	.73
5.	Check: Are connections to proper pins 1 & 2, 2 & 3, 4 & 5?	.15
	Is buss wire properly insulated by sleeves?	.10
	Have you returned excess wire & sleeving to their respective trays?	.03

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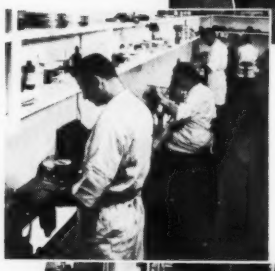

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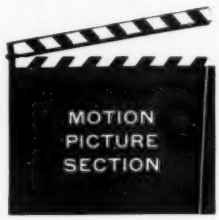
IN-PLANT TEST



Joseph V. Mascelli reports on the Perfectone tape recorder for on-the-spot recording

Specifications: Perfectone EP 6A completely transistorized 1/4-in. synchronous tape recorder. Measures 4 x 10 x 13 in. Weighs 16 lbs. Operates on 12 standard 1½-volt "A" type flashlight batteries for ten to twelve hours of actual recording. Electronic controlled regulator keeps constant 7½ in. per sec. tape speed. Records "sync pulse" for later transferring lip-sync sound tape to optical or magnetic film. Simple push button control. May be operated in any position, including over-the-shoulder for recording tracking shots with hand-held "fish-pole" mike boom. Manufactured by Produits Perfectone S. A., Bienne, Switzerland. Imported, sold and serviced by Magnetic Sales Corp., 1147 North Vine Street, Hollywood 38, Calif. Price: $1,285 for basic recorder. Modular mixers, microphones, control box, inverter, etc. optional and extra.

Joseph V. Mascelli reports: A few months ago the Armour Meat Company requested our firm, Cunningham-Mascelli (A Division of Bolder Enterprises, Hollywood), to make a series of four 16mm motion picture field reports on a new cattle feed additive called DYNAFAC. On the spot "You Are There" type of color documentary sync-sound interviews with cattlemen, stockyard men, feed lot operators, slaughterhouse men and restaurateurs in the Omaha-Sioux City area were desired. The assignment called for highly portable, top-quality sound equipment operated by a small crew on a tight schedule since the budget allowed only a fast swing through the many locations, both indoors and out, and rapid, no-nonsense filming, since actual operations could not be halted for any appreciable time.

Since we anticipate such location type sync-sound films in our role as industrial film producers we are in constant touch with developments in the sound recording field.

Just before we received this job, we were notified by Mr. Loren L. Ryder, head of Ryder Sound Services, Hollywood, that his organization was experimenting with a new

Modular single dial mixer, Perfectone recorder, automatic camera control box and

completely transistorized, top-quality synchronous tape recorder that could be operated in the field on ordinary flashlight batteries. Working at fever pitch with the Ryder group, we were able to aid them in solving the camera-tape recorder linkage problems in time to cover the Armour assignment.

Mr. Ryder and his engineers came up with an ingenious, small group of light weight components completely solving the problem. It was decided to use the regular 115-volt, 60-cycle, single phase self-synchronous camera motor to operate a 16mm Arriflex camera. A transistorized invertor and camera control box (which operated the recorder remotely through the camera switch) completed the set-up. A single 12-volt storage battery supplied the DC input to the invertor, which provided the 115-volt alternating current to the camera motor and the necessary 60-cycle pulse to govern its speed. The 60-cycle pulse was also fed into a "frequency doubler" in the control box which converted it into 120 cycles for recording on tape. This ingenious pulse is the key to synchronous shooting with the Perfectone, for this pulse is later fed to a synchronous amplifier which in turn drives the motor of the re-recorder. Synchronization is based on a *time*, not a *linear*, factor, so that regardless of the tape speed, the 16mm or 35mm magnetic film is re-recorded to match the original sound. The resulting sound film can be edited "side by side" with the picture film.

The Perfectone records the sync signal separately from the audio signal and at the same time provides a full track recording. This gives maximum available-signal-to-noise

(*continued on page* 103)

transistorized inverter (with handle).

first IN EDITING EQUIPMENT

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PHOTOGRAPHY IN WEAPONS TESTING

by L. E. Davidson, Engineering Laboratories, Development & Proof Services, Aberdeen Proving Ground, Md.

The past decade has seen the adoption of many revolutionary concepts in weapons during the pursuit of security from assault by aggressors. Recognizing the dangers of obsolescence, the agencies responsible for the defense of the nation continually work for improvements in armaments. Artillery and rocket launchers are hurling lethal cargos faster and farther and warheads are being studied for ways to increase their yields.

This quest for maximum weapon effectiveness has resulted in data requirements that sometimes tax the capabilities of standard instrumentation and techniques. To determine why a certain type projectile fails in flight is imperative if that projectile is to be made effective. Because of the speeds of the projectiles being tested, it is impossible for the human eye or for the conventional camera to obtain the necessary information. Recording the explosion of a shell, or measuring the velocity of the hundreds of fragments blown from it is also beyond the capabilities of the ordinary camera, and of many electronic measuring devices.

At the Aberdeen Proving Ground we have found high-speed photography holds the answer to many of our problems concerned with stopping motions and freezing them in time, so that transient events can be studied, and data obtained which will assist in improving weapon performance.

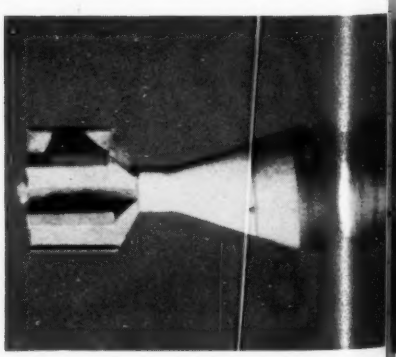
Timing of the various events which are photographed is accomplished by pulsing NE-2 neon filled lamps inside the cameras which produce timing lines along the film edge. The pulse frequency is controlled by a crystal stabilized oscillator and up to 100,000 pulses per second are used for timing events of short duration. The lamps must be biased to glow just below the film sensitivity threshold and be pulsed at a higher voltage. Unless this mode of operation is followed, the lamps, although functioning well in the light, will not operate in the dark camera interior.

Usually black-and-white film, ASA 200 to 320 is used for most of our high-speed requirements. (Tri-X or a similar type.) Exposure is quite often based upon experience with the particular situation, although ASA ratings serve as guides in new tests. Processing is done in a spray-type automatic processor at an operating speed of 28 ft. per min. at 80°F temperature. Extra hardener is added to the fixing solution to prevent emulsion softening. The resulting negatives have the high object-to-background contrast necessary for optical measuring.

SLIT PHOTOGRAPHY

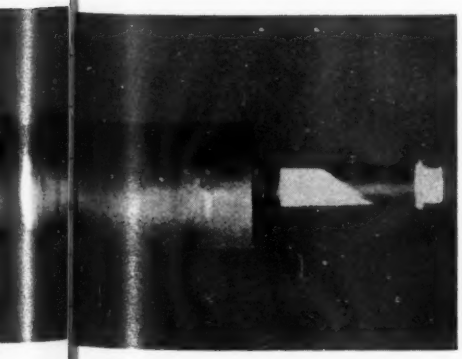
Shutterless or 'smear' photographs obtained by use of a slit in the camera have proven to be very effective in evaluating projectile performance. The cameras used in this technique are standard rotating prism continuous film movement types which have been modified by removing the prism and attaching a slit about 0.030 in. wide near the focal plane perpendicular to the direction of film travel. Usually auxiliary illumination is required and this is obtained with No. 22 flashlamps, programmed to be at peak intensity when the projectile passes through the camera field. Camera operation, flashlamp ignition, and gun firing are usually controlled by a sequence timer, which is a slow-speed motor with adjustable, cam-operated switches. When using the slit technique the approximate velocity of the projectile must be known so that the operating speed of the camera can be matched to the projectile image speed. The flashlamps are programmed to be at peak intensity when the projectile is in the camera field. The results resemble those obtained with a focal plane shutter, non-moving film and a fixed subject. The final product is one well-defined, large image of one high-speed object per roll of film exposed.

Fig. 1 Typical smear camera record of projectile in flight. One picture per roll is obtained. *(See below.)*



(Figure 1) To the casual observer, this might appear to be an expensive method of photography, since only one photograph per roll of film is produced. Actually the cost of the film is insignificant when overall test costs and the importance of the one photograph are considered. To obtain a continuous record, ten or more cameras are often used along the trajectory of a projectile to determine its flight characteristics from the muzzle of the gun to the face of the target.

Slit photography is also used to determine the velocity and acceleration of certain projectiles as they emerge from the muzzle of the weapon. When the shape of the projectile permits, two contrasting parallel lines are painted around the circumference of the projectile to serve as a measurement standard. When this is not possible, calibration targets in the field of view are used. The camera is placed with its slit parallel to the horizontal trajectory, with the film traveling vertically. The camera covers the first 8 to 10 ft. of trajectory with the gun muzzle just outside the field of view. The camera supply voltage is adjusted to provide a film speed approximately 125 ft. per sec. As the image moves along the horizontal slit, the film moves in a vertical direction. The record shows a time-displacement curve of projectile travel in a vertical plane parallel to the trajectory. (Figure 2) From this record one can compute the velocity and acceleration of a projectile with a high degree of accuracy.



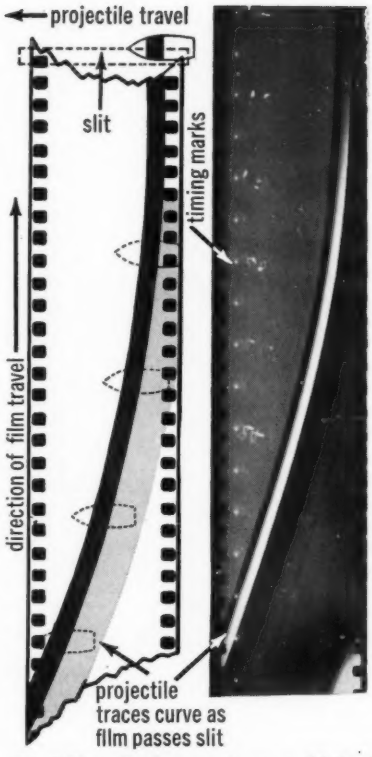


Fig. 2 Time displacement curve obtained by smear technique. Schematic drawing *(left)* interprets photo *(right)*.

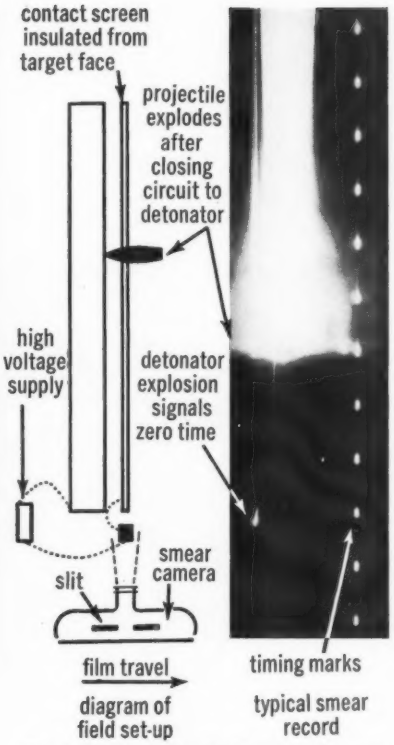


Fig. 3 Fuze function testing. Photograph displays zero reference charge, time record and the fuze function explosion.

Ordnance designers often require accurate measurements of the time that certain projectile fuzes take to operate. A special application of slit photography has been developed to obtain this information. (Figure 3) The projectile with fuze attached is fired at a target which has a wire screen on its front surface. The screen is insulated from the target and a small explosive charge is connected through the screen and target to a high voltage supply. When the projectile strikes the target it completes the circuit and triggers the explosive. At the same time the fuze mechanism begins its cycle and when completed, the projectile detonates. The difference in time between the two explosions is considered the fuze delay.

Because an inherent delay exists in the explosive used to establish zero time, a number of the charges were tested to establish the delay constant. This was done by connecting the explosive in a circuit with a charged high voltage condenser and an electronic counter. The start of the counter was triggered by closing the circuit which also fired the condenser. The counter was stopped by utilizing the conductive effect of the ionized gases produced by the explosion. The delay times were analyzed statistically and found to be constant for all practical purposes.

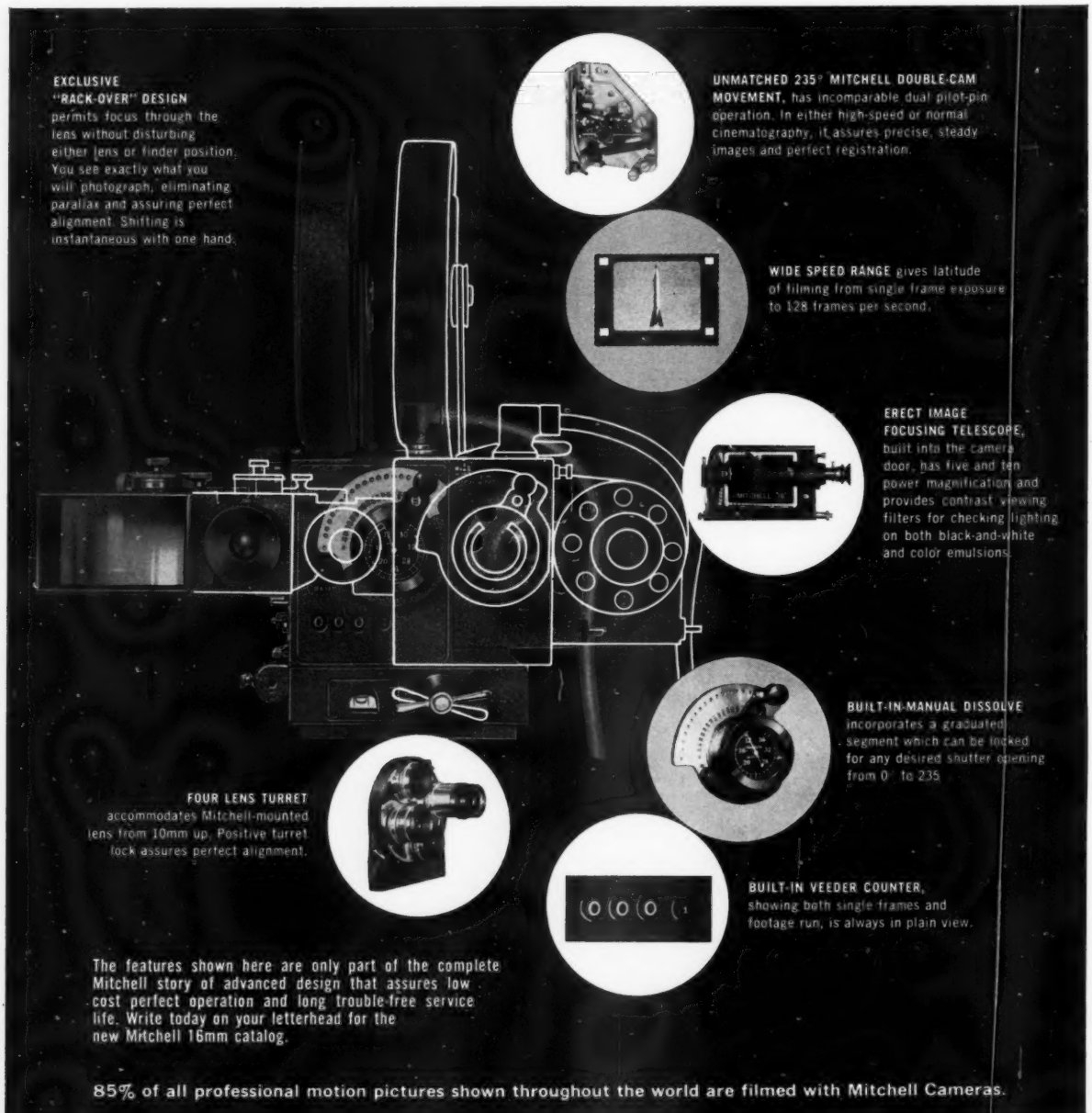
When measuring the fuze times, the camera is positioned so that the target and the zero reference charge are in the field of view of the camera. The camera records first the flash from the reference charge and then the fuze function explosion. Since timing marks appear directly on the film, computation of fuze delay is only a matter of differencing the two times and adding the constant for the reference charge.

(continued on page 67)

MITCHELL CAMERA BULLETIN

7 first time features for 16mm camera users

Mitchell 16 is different from all other 16mm cameras because it offers for the first time—advanced film making features previously found only in Mitchell 35mm professional cameras. This is the only 16mm camera with the remarkable capability of being able to film the full range of today's broad requirements for all types of motion picture work. Its proven engineering assures the finest brilliance, and fidelity of any camera in existence.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FRAMING CAMERA PHOTOGRAPHY

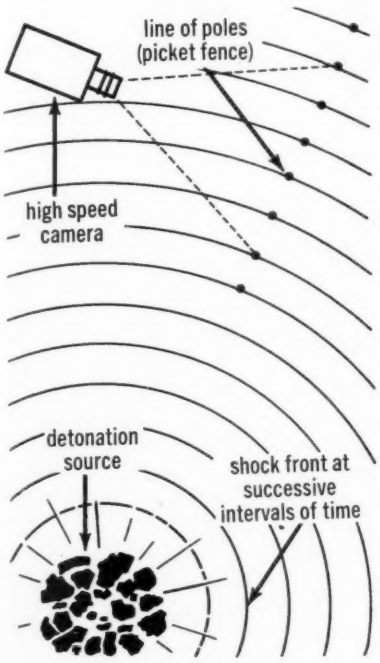

Fig. 4 Blast pressure measurement using high-speed photography

Rocket warheads are often detonated in the open air to obtain test data and high-speed photography is used to measure the increase in air pressure produced by these explosions. Although the data may be obtained with electronic instrumentation, the photographic method is effective and the field set-up is quite simple.

This technique is possible because of the occurrence of a sudden change in refractive index of the denser air at the shock front. After an explosion, a shock wave is initiated by rapidly expanding gases which compress the surrounding air. The wave is similar to a sound wave since it travels through the atmosphere without moving the air along with it. The shock wave has a front, a "shock front," which is characterized by a discontinuity in density, pressure and temperature of the air through which it passes. High-speed cameras are pointed toward a background of either equally spaced poles or stripes upon a wall. When the shock front passes between the cameras and the background, each pole image is momentarily distorted and the vertical images appear to become displaced sidewise. The shock wave velocity is determined by measuring its movement as indicated by the distorted pole images and computing its travel as a function of the time shown on the film. Blast pressure is then computed using equations which relate pressure to velocity. This method is successful as long as good image quality is obtained and the background is front-lighted, i.e., from the direction of the cameras. Maximum image displacement occurs when the camera line of sight is tangent to the shock front and the locations for cameras, background and explosion are selected accordingly. (Figure 4) Several measureable frames per pole or stripe position are necessary which requires camera speeds in the 4000-10,000 pps range.

The velocity of fragments at a specific distance from a detonated projectile is obtained with high-speed photography. The basic scheme consists of photographing a statically exploded round and the impact of the fragments some short distance away. (Figure 5)

The camera is aimed at the back of a target and the fragment impacts are detected by the holes they make in the target. The test projectile is supported on a post about 25 ft. from the target, which is a two-layer affair. It is made of 2 x 4-in. uprights with metal foil covering the front side and thin sheet plastic on the back with flashlamps between the two layers. The lamps are programmed to be at peak intensity when the fragments hit. The holes made by the fragments are brightly illuminated and record well on the high-speed camera film. The target is marked either into circular or square zones. The distance between the projectile and a particular zone with the time of impact from the film is used to compute the velocity.

Many other applications of high-speed photography may be observed in the daily testing of artillery, rockets, tanks and ammunition. Thus the photographic engineer continues to contribute to progress in the field of weapons technology. —THE END

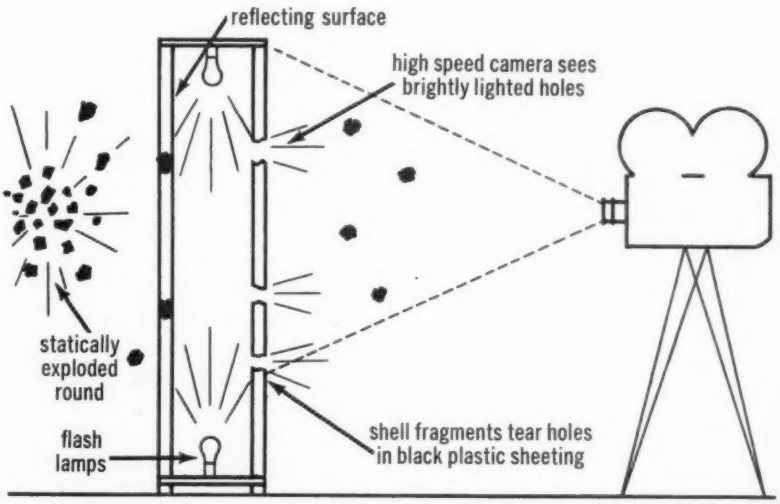

Fig. 5 High-speed camera detects fragment penetration of rear target surface

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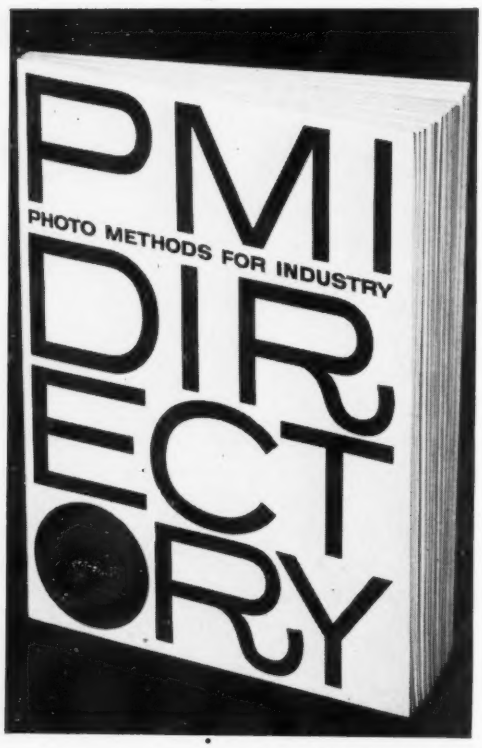

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MANHATTAN IN THE DARK

The military takes the security wraps off a photo made by an infra-red system capable of aerial reconnaissance photographs day or night

On a cold winter's night two years ago a low-flying private plane completed a mission over the Upper New York Bay and the island of Manhattan. It may prove to be a landmark in aerial reconnaissance.

The mission was to display the abilities of an infra-red recording system. The system makes photographs which are unprecedented in detail, regardless of light conditions.

The photograph, a contact print of which is displayed (*right*), came to be called "The Manhattan Picture" as it circulated in high places in the Department of Defense. The Office of Security Review declassified the picture for release February 26 by HRB-Singer, Inc., State College, Pa. It had been made at 11 p.m., January 9, 1958.

The Manhattan Picture was made solely with heat radiating from the city and the harbor by means of an HRB-Singer, Inc., reconnaissance device called Reconofax. The Reconofax device used for the picture was conceived in 1948 and developed in 1951. Components are 1) an infra-red collecting device composed of curved mirrors, 2) an "improved detector" on which the collecting device focuses heat radiation, 3) a lateral scanning device, 4) an electronic, infra-red to visible-light conversion system and 5) a 70mm film transport.

Although the scanner in this case operated only laterally, a complete picture is possible because the plane carrying the device and the film transport moves the length of the picture. Picture length is limited only by the fuel capacity of the plane and the size of the film load.

The picture shown is a positive —a print from the original Plus-X negative (color sensitivity and speed of the film are not critical so many films could be used). Light areas are relatively warm and dark areas relatively cold. Thus the harbor waters, which store the day's heat longer than land areas are nearly white, as are power plants and closely packed skyscrapers.

In calling attention to the detail recorded in the photograph (some of which may be lost in photo-mechanical reproduction) a representative of the manufacturer said, "Reconofax's ability to resolve small changes in temperature is seen in the clear definition of roads and paths in Central Park *(upper left)*. An indication that Reconofax may be valuable in submarine detection is seen in the case of ships in the Hudson River *(left edge)*. The calm water beside a ship is easily distinguished from the agitated water in its wake. A submarine's wake might thus be made visible."

By utilizing a radio relay system, a picture could also be developed almost simultaneously at a surface station.

In discussing possible applications of similar devices, it was stated, "Since different land and water surfaces emit varying degrees of heat, Reconofax can be used in hazardous areas for obtaining weather, oceanographic and topographic data. For example, water temperature is said to be correlated with water depth. The contours of a shore line can thus be determined from the air."—THE END

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Get more information. Circle 438, page 93

by Ernest E. Reshovsky

PHOTO INSTRUMENTATION

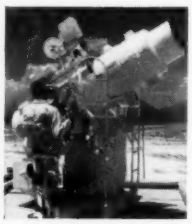
Photo-instrumenting missile test range requires varied equipment

White Sands, New Mexico. The Holloman-White Sands range is the largest area in this country set aside for the exclusive development, testing and launching of missiles and rockets. Here is located the Air Force Missile Development Center and the White Sands Proving Ground. The area has been surveyed to a geodetic precision exceeding that of any comparable area in the world. This was achieved through the combined efforts of the U.S. Coast and Geodetic Survey, the White Sands Proving Ground and the Air Force Missile Development Center. In the area are found lines to 90 miles long, the accuracies of which are known to less than one millionth of their length. Such precision is of the greatest importance for evaluation of test results the majority of which are recorded optically. Land Air Inc. is performing data collection affecting a major portion of the range, including installation, operation, maintenance and improvement of range instrumentation systems. The organization uses tracking telescopes, cinetheodolites, ballistic cameras, and high-speed motion picture gear.

IGOR *(Intercept Ground Optical Recorder)*

This instrument is used to provide historical records of performance, intercept miss-distance, missile attitude, aspect, and angle of attack. It is a modified five-inch Navy gun mount which supports an f/6.3 Newtonian Telescope with a focal length of 96 in. and a 16-in. primary mirror mounted on a tubular frame work. A 35mm Mitchell high-speed motion picture camera with 400 or 1000-ft. capacity film magazines is used for primary photographic recording. Seven IGORs, five of which are permanently mounted and two of which are used as mobile instruments are currently in use.

TETRA *(Terminal Trajectory Telescope)*



This is used to provide historical records, firing error indicator data in the form of vector miss-distance, missile attitude, aspect and angle of attack and rough (selsyn) position and trajectory data. It consists of a modified gun mount which carries a f/4.5 Newtonian Telescope of 82-in. focal length and 18-in. primary mirror mounted on a tubular framework. It has a hydraulic aided tracking system. A 70mm Mitchell high-speed motion picture camera operating at 40 fps. with 100-ft. film magazines is used for primary photographic recording. Four of these instruments are in use; two permanently and 2 mobile installations.

HIGH-SPEED CINETHEODOLITE

This is a precision tracking instrument which photographically documents the flight of a target while simultaneously recording the azimuth and elevation angular data of the object against a coded time base. By combining the lines of sight of two or more synchronously operating instruments, the space position of the target can be determined. Velocity and acceleration can then be computed from the time-position data. The photographic record also provides time history, event, attitude, and intercept data. The main optical system is a Cassegrain telescope with variable focal lengths of 60,

(*continued on page* 72)

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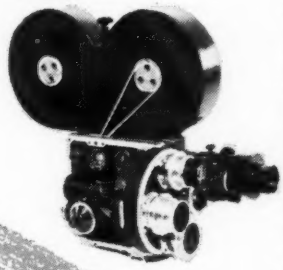

hi-speed motion picture equipment

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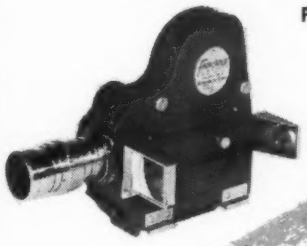
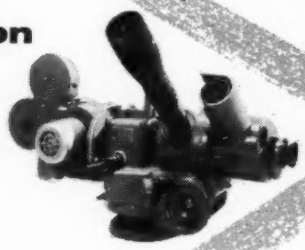


cine theodolites and triangulation cameras



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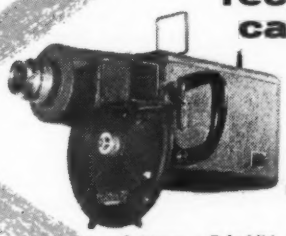

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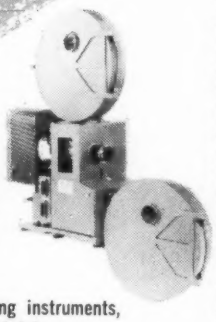

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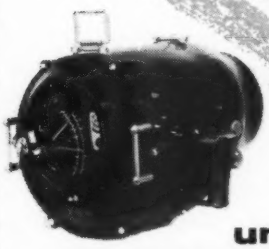

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PHOTO INSTRUMENTATION

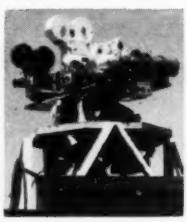
(*continued from page* 70)

96, 144 and 180 in., selected by interchanging the secondary mirrors. The camera is a 35mm Mitchell camera movement modified to provide frame rates of 10, 20 and 40 frames per second.

M-45 TRACKING TELESCOPE

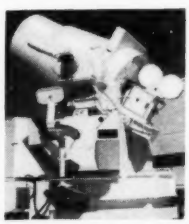
This is used to provide historical records of performance, intercept miss-distance, missile attitude, aspect and angle of attack. It is a modified M-45 gun turret mounting a 132-in. focal length f/9 reflector system with a 35mm Mitchell high-speed motion picture camera as primary recorder.

TRIC *(Tri-Camera Mount)*



This instrument is a modified B-29 turrent and is used to provide engineering surveillance and time history data on the sleds at the High-Speed Track here. It can carry three recording cameras such as 35mm and/or 70mm Mitchells with medium-to-long focal length lenses.

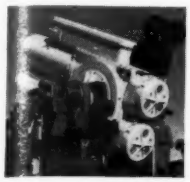
SMT *(Small Missile Telecamera)*



This is a tracking telescope with cinetheodolite capabilities. It was designed for determination of the velocity and vector miss-distance of small high-speed missiles. It can also be used in a fixed position similar to the Ballistic camera with the calibration plate camera mounted on the trunnion to photograph a star field or ground target. The primary recording camera for the main optical system is a full frame 70mm Mitchell (operating at 60 fps which records the time of the missile through the field. Precision position data is obtained by protogrammetric techniques with the azimuth and elevation data recorded from glass circles and shaft angle digitizers. This angular data is recorded by a 35mm Mitchell camera. A code is provided on the glass circles for

automatic data reduction. The main optical system is a corrected Cassegrainian f/3.3 system of 100-in. focal length (30-in. primary mirror) mounted on base and trunnion castings which have a rotating accuracy of 10 seconds of arc. SMT has a hydraulic aided tracking control system. One SMT is in operation here and a second one is planned for the future.

ROTI *(Recording Optical Tracking Instrument)*



This is a large cinetheodolite designed to provide high precision photo recording of a moving object in space and time. It is a twin telescope, each of 16-in. aperture, with a selection of 50, 75, and 100-in. focal length in the lower telescope (a basic f/3.1 Schmidt System) and a selection of 100, 200, 300, 400 or 500-in. focal length in the upper telescope (a basic f/6.3 Newtonian system). Angular data and time is photographically recorded and digitized for recording at the station or for transmission to a central recording station to provide two forms of precise position data of an object in space. The mount is a modified Navy Mark 30.5-in., 38 cal. gun mount with an aided tracking system. Each of the primary telescopes uses a 70mm Mitchell camera while the angular data is recorded on a 35mm Mitchell. The cameras are all synchronized for correlation purposes.

SERVO-TRACKED *(Turret Camera Mount)*

This instrument is used to provide photographic records of performance, target attitude and intercept miss-distance data. It consists of a modified B-29 turrent which mounts a medium focal length lens (20-in., 600mm, 40-in. or 48-in.) and a 35mm Mitchell high-speed motion picture camera with 400 or 1000-ft. film magazines. Four of these mobile telescopes are presently in use here by Land-Air Inc.

For more on the use of photography in weapons testing read L. E. Davidson's article which starts on page 64 of this issue. It discusses high-speed photography as employed at Aberdeen Proving Grounds, Md.

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The Hulcher 70, Model 102 camera is available for remote or local pulse operation by hand or programmed switch, at rates up to 5 per second and simply by flipping a switch, the camera will operate at 10 f.p.s. sequence with same preset exposure. It can also be immediately switched back to pulse operation. Pulse system is complete, requiring only an external switch. Shutter speeds range from 1/50th to 1/1440th of a second for pulse operation. The same camera still operates at sequence rates from 5 to 20 per second. A wide range of lenses with reflex focusing are available. Camera is available for use with 12, 24 or 115 volts.

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ULTRA-VIOLET LIGHT FOR PHOTOENGRAVING

Photoengraving is used in the manufacture of printed wiring boards at the North Carolina Works for use in the fulfillment of government contracts. In the process, a full scale photographic negative is placed over the sensitized copper face of the board and held tightly against a glass plate in a vacuum frame. A light is directed through the negative to print the circuit on the copper. The area void of printing is then dissolved away in an etching solution, leaving only the desired printed circuit.

A carbon arc lamp was originally used as the light source for the process. Although it had a low percentage of the necessary wave length of energy, its intensity was sufficient to do the job. This lamp had two electrodes, each drawing 50 amps at 200 volts, and consumed 11,040 watts of power. The rapid burning of the tips caused some dust and necessitated the replacement of tips during each eight-hour shift.

The carbon arc lamp was placed approximately three feet in front of the vacuum frame to provide an even distribution of light over the negative. Since the arc was mounted parallel to a wall, its extreme brightness had to be shielded. In order to eliminate the objectional features of dust, brightness and replacement costs, a way was sought to eliminate the carbon arc light entirely.

A large percentage of all light sources emit some energy at the necessary wave length to expose the sensitizing material used on the copper. The material is sensitive to light energy in the wave-length band between 3,000 and 4,000 Angstrom units, in the ultra-violet spectrum.

After investigating the special energy distribution curves and tables for all general types of lamps, a black-light fluorescent was chosen. The radiation of a 40-watt black-light fluorescent lamp in the required band was 32 times that of a 40-watt standard cool-white fluorescent lamp. The fact that the lamp was a tube and emitted energy uniformly along its entire length permitted placing the lamp closer to the negative. A size was chosen that would be long enough to span the vacuum-frame face in its long direction. Fourteen lamps were placed one-half inch apart across the face of the frame to provide uniform distribution in the other direction. The 14 lamps were mounted in an enclosure with single lamp-trigger start ballasts mounted directly above the lamp socket mounting plate. These ballasts were chosen to give uniform and rapid start up of the lamps. The inside of the enclosure was painted white to act as a reflector.

The enclosure was attached to the glass frame above the vacuum frame as shown in the photograph. The glass frame and lamp enclosure were counter balanced to provide ease in loading. The lamp mounting plate and glass frame mounting support were hinged to provide access to the lamps for cleaning of the glass and for replacement. A timer was provided to control the exposure time.

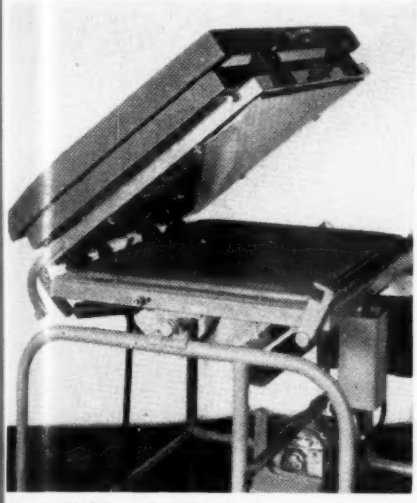
The resulting machine occupied the space formerly occupied by the vacuum frame alone, resulting in a savings of approximately 15 square feet of floor space. The cost of replacement of the carbon tips was eliminated since the life of the fluorescent lamps is expected to exceed two years. The input voltage of the black-light fixture is 115 volts and the complete unit consumes 1,740 watts of power. The exposure time required was decreased from approximately three minutes to one minute which means a reduction from 552 to 29 watt-hours of energy per exposure.

The original black-light machine was designed by the Greensboro Factory Planning Organization and built by the Plant Construction Department in March 1957. After a short proving-in period, the new light source was found to exceed original expectations; and the old arc lamp was declared surplus.

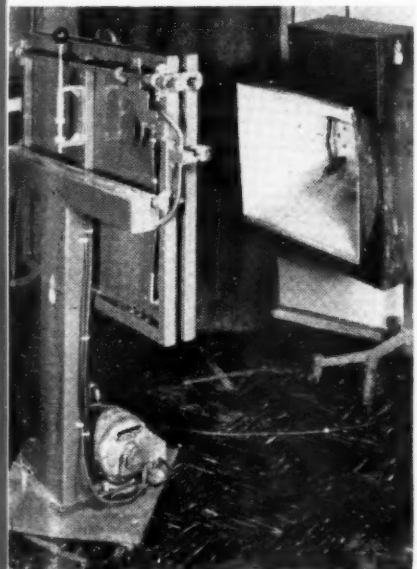
This machine was the first known application of black-light, in the ultra-violet spectrum, for this purpose. The design of this machine makes it more economical to construct and simpler to operate and maintain than any similar machine now on the market. A second machine was constructed in January 1958. This machine was made slightly larger to accommodate larger boards. Another machine, using the same drawings, was recently built by the Bell Telephone Laboratories for their use at Whippany.—THE END

Western Electric's W. R. Bruce deserts point light source equipment for cleaner, more actinic fluorescent black light

Text and photographs courtesy of the Western Electric Engineer



Black-light printed circuit exposing unit is compact, inexpensive. Bank of tubes is attached to hinged glass frame.



Arc lamp exposing device declared surplus. Objections of Greensboro WE factory were dust, maintenance and visual brightness, as well as long exposure time.

P.C. TARGET

by J. K. Cornell

Lockheed's Missiles and Space Division, like many other companies, through necessity is in the printed circuit business on a major scale. Inevitably, problems arise. Lockheed's solution to one in particular may be of help to other companies who find themselves in the same situation. Basically there are two reasons for this problem; one is our explosive growth and, in consequence, large numbers of new personnel. The other is the presently unavoidable practice of having no one person or group responsible for all circuit design.

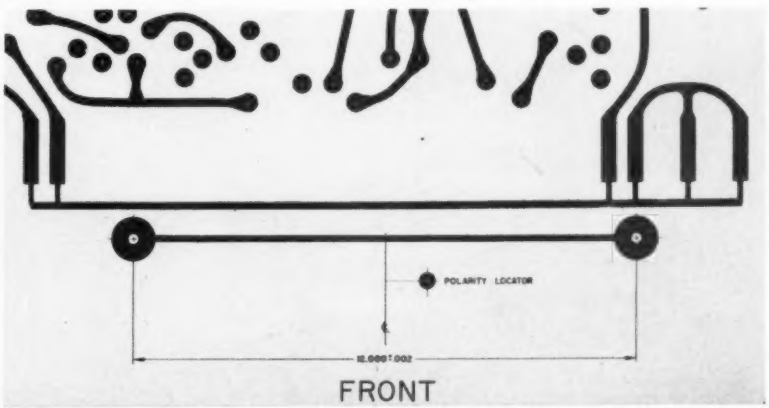
With a number of groups initiating circuit design as well as the art work preliminary to reproduction, we were plagued by lack of standardization. Each design was drawn approximately four times oversize on stable base material and after the drawing was finished, reduction targets spaced to the required reduction for the particular circuit were applied.

Use of this method resulted in a situation wherein it was purely accidental when any two drawings had the same reduction factor. Since we are required to hold very close tolerances, in most cases to plus or minus .001 in., much time was spent in setting up the camera for each circuit.

Searching for a less time-consuming method of producing circuit negatives under these circumstances we started with the camera. We found that it could be set accurately within tolerances for a given reduction using its built-in indexes. The next step was to establish a standard reduction for each circuit. We developed a three point target with two points for our use and the third point for shop use in setting up the jigs. A master negative was made on stable base material with complete accuracy, plus or minus zero, for use in producing positive targets in quantities. These positive targets are now supplied to our design groups and are applied to all circuit drawings. Designers use the target as a guide for all circuits.

When the drawing reaches the photo unit we set the camera either one quarter or one half size as required and shoot. Only occasional spot checks are required to insure no slippage in the camera indexes. The net result is production of circuit negatives about ten times faster than the previous "trial and error" method.—THE END

Target for ½-size reduction as reproduced with circuit. The "polarity locator" guide for shop use prevents accidentally flopping circuit.



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PMI IN-PLANT REPRODUCTION

Herbert P. Paschel

GRAPHIC ARTS

More ways than one to skin a cat —or to dupe an 8½ x 11 drawing

A reader proposes an interesting approach to a duplicating problem. The alternatives are varied and many and, to this writer, far more practical:

"A problem that confronts us is in the making of 8½ x 11 negatives for offset printing. The originals are mostly drawings of the graph type with LeRoy lettering.

"A method of making a negative directly has come to my mind. My thought is that we make the drawings on a transparent film with a water or acid soluble ink. This would then show up as a positive that could be used for whiteprints if needed. The next operation would be to make the transparent portion of the drawing opaque. Then, by washing out the ink lines this would leave a negative ready for offset platemaking. Any comments you have on the feasibility of this process or its alternative would be appreciated."

—R. N., Waltham, Mass.

The idea of converting a positive drawing into a negative for platemaking obviously has merit. But why bother to do this when even simpler and more satisfactory methods are available? Perhaps you are not aware that conventional offset platemaking processes are available in two types —negative-working and positive-working. With the positive-working processes the drawings themselves can be used directly in platemaking providing they have reasonably opaque lines and lettering, and are on a transparent or highly translucent support.

If you already have a fully equipped platemaking department, and experience in coating and processing your own plates, you have a choice of two do-it-yourself systems.

The simpler approach is to use positive-working presensitized plates. In general, the steps in processing positive presensitized plates are:

Exposure. Same as for negative plates except that positives are used. In your application the drawings would be used, face up.

Development. The exposed sensitizer is removed with a special solution following which the plate is rinsed with water.

Fixing. A special solution is applied to neutralize the developer and completely desensitize (fix) the image.

Lacquering. Intensification of the image to provide maximum durability and ink receptivity is accomplished by rubbing the plate with a special lacquer emulsion.

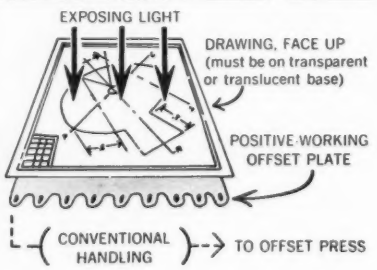
Gumming. The application of a weak gum solution preserves the plate until used.

The operations outlined take only a few minutes to perform and do not require any special equipment. You need only purchase the plates and companion processing solutions.

The alternative is to use the conventional deepetch process which is,

(continued on page 78)

CONVENTIONAL PLATEMAKING METHOD



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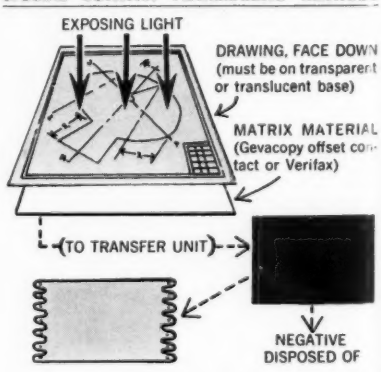

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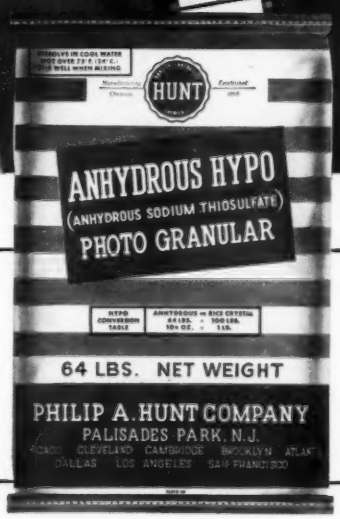

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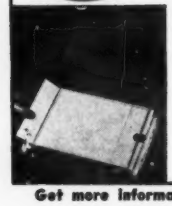

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(*continued from page 76*)

however, a much more involved and costly platemaking method. In addition to the standard operations common to both albumin (negative) and deepetch platemaking—coating, exposure, etching, gumming-up, etc.—deepetch plates require developing the exposed plate with a special solution, deepetching to provide a recessed base for the final image, and the application of lacquer and ink. Following exposure the development treatment removes the unexposed coating (corresponding to the lines and type of the drawing), and this creates a negative stencil on the plate. The stencil acts as a mask for the deposition of the lacquer and ink. The stencil is finally removed. As with the previous method the drawing is placed on the plate face up to obtain a correct reading image.

Since you desire to avoid the photographic steps necessary to convert your drawings into camera or contact negatives, you should investigate several platemaking systems that accomplish this and eliminate the usual platemaking operations at the same time. Two contact photocopy systems with platemaking features can easily be adapted to your needs—Verifax and Gevacopy. Although both are based on the reflex copying method there is no reason why the sensitive materials involved cannot be exposed by direct contact (shoot-through) from your drawings.

With the Verifax method you would make an exposure onto the matrix material and, following exposure, develop the matrix. The next step is to transfer an image from the matrix to a paper offset master. The latter step would require a special transfer device. Exposure and development could be done in existing equipment or in the Verifax combination exposing and processing unit.

The Gevacopy process operates similarly although a different principle is involved. Following exposure the sensitive material is inserted in a special processing machine in which the paper is immersed in developer and automatically squeegeed into contact with a special aluminum offset plate. A positive image is transferred to the aluminum plate in about one minute after which the paper is removed and discarded. After a brief surface treatment the plate is ready for the press.

In both the Verifax and Gevacopy methods the total time consumed in making a plate is less than three min-

(*continued on page 80*)

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Get more information. Circle 433, page 93

GRAPHIC ARTS

(continued from page 78)

utes. And the investment in the necessary equipment is minimal. All of the operations can be carried out in normal room illumination. The recently announced Ektalith Plate is a camera speed version of the Verifax process. The Gevaert method is likewise available in contact and camera speeds—Gevacopy Offset Contact and Gevacopy Offset Rapid. This permits using either method in such cases where a drawing is to be duplicated in enlarged or reduced size. The camera speed materials must be handled in a darkroom.

There are still a number of other methods that you could use but these require the purchase or rental of special equipment.

Xerox. This is an electrostatic, completely dry process with a wide selection in equipment. The manually operated equipment includes a choice of fixed-focus (same-size) or focusing cameras. In contrast, the 914 Copier is a fully automated machine that makes same-size offset masters as well as paper copies.

Electricon. This is a variation of the Xerox process. The Electricon camera and processor is fully automated and produces a paper offset master direct from the drawing in less than a minute.

Photoplax. This is a combination of a camera and processing unit for producing plates by the DTR process (similar to Gevacopy).

As this summary points out, there certainly is no dearth of methods to achieve your purpose. And you need not wrack your brain trying to evolve a method for converting your drawings into negatives. Unfortunately, in the midst of all this plenty, you might find it hard to decide which method to use. Should you want to retain your present platemaking method you can make paper negatives in about a minute—about as fast or faster than any system you could devise for converting your drawings. Merely use the Gevacopy Contact process in conjunction with a paper receiving sheet. Wash and dry the expendable negative and use this for your regular platemaking system. And, as a bonus, you'll get one positive paper copy of your drawing. Or, if you prefer, you can make this positive on film instead of the paper print.

Of course you could also get a paper negative with conventional reflex copying methods (such as used by the Royal Scot office copier) or with photocopies on paper or translucent paper exposed and processed in such as a Photostat or Haloid photocopier. All of the foregoing methods have been discussed in detail in previous issues of PMI. The references follow: • Vol. 1. No. 5, May, 1958 • Vol. 1. No. 12, December, 1958 • Vol. 2. No. 9, September, 1959 • Vol. 2. No. 11, November, 1959 • Vol. 2. No. 12, December, 1959.—THE END

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(continued from page 13)

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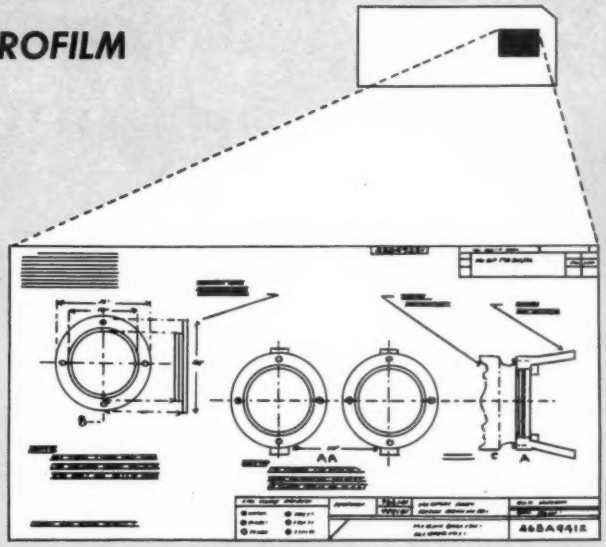

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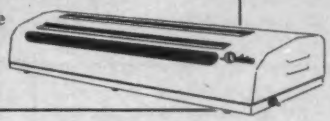

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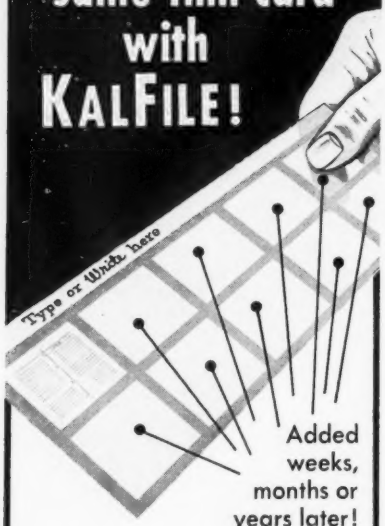

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PMI IN-PLANT REPRODUCTION

Vernon Tate

MICROREPRODUCTION

Hurdles for microfilm: economics, technology, technique and words

The art, practice and industry of microreproduction is based on the solid technological fact that documents of all types can be photographically reproduced at considerable degrees of minification and subsequently enlarged back to original size without noticeable loss of definition or utility. This fact was understood well enough over a hundred years ago, but widespread application in this field as in many others only became possible when adverse cost factors were overcome.

A special circumstance, notably the siege of Paris, leaped the economic hurdle and so permitted a really significant large scale microfilm program to develop in 1870. (For details see F. Luther, *Microfilm: A History 1839-1900.*) When these conditions no longer prevailed, microreproduction became too costly to be continued.

Fifty years later in the decade beginning in 1920 economic factors changed for the better and the widespread development of microfilm technology quickly followed. The motion picture industry had made unlimited amounts of film of excellent quality available cheaply; lens and camera manufacture posed no particular difficulties; real documentary problems that demanded solutions existed and there were those equipped largely with imagination and foresight to tackle them. The stage was set for the stirring developments of the next decade.

The progressive 30's

The ten years beginning with 1930 were most interesting and exciting. They brought specially designed cameras for microfilm, printing and processing equipment and reading machines, which incidentally formed the first unique contribution of microreproduction to the photographic industry, special film stocks and many other equipment and supply developments. Coincidentally applications and uses were found or developed in myriad fields. Progress conclusively demonstrated that microreproduction was not merely a cheap substitution medium for routine work but that it was a promising gateway to entirely new concepts in creating, maintaining, using and safeguarding records; beyond this threshold the infinitely broader fields of data handling and manipulation were to come.

World War II and its aftermath made the decade of 1940 a race against time. In 1940 the United States was in an excellent position to make use of microphotography and did so on a scale not dreamed of in earlier years. Existing technology was hard pressed to meet compelling demands and the fringes of research were pushed ever outward while application again fell behind.

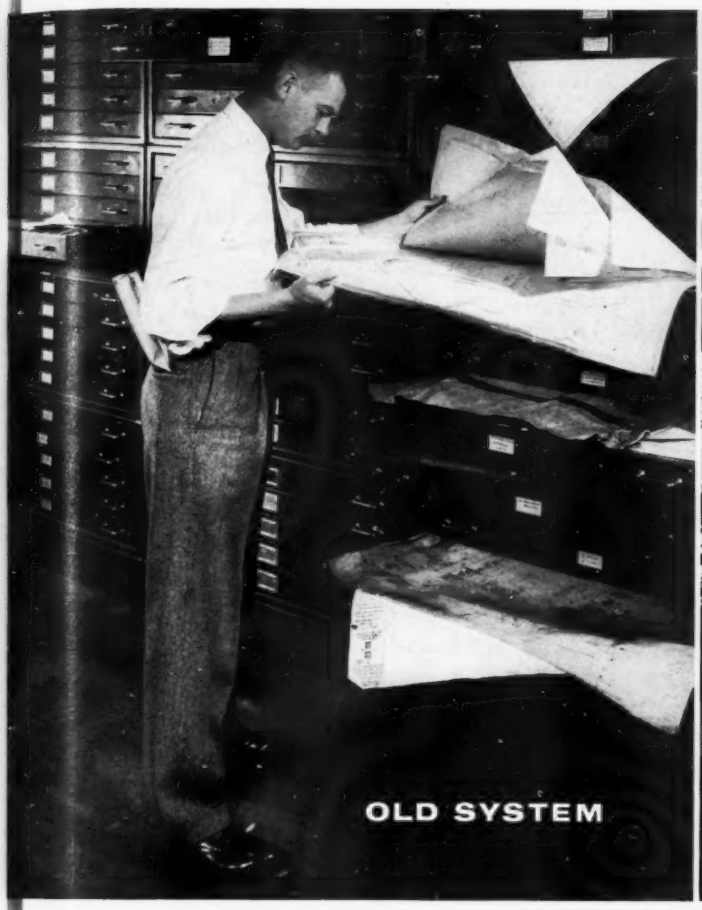
In the decade 1950-1959 just ended, application began to catch up somewhat, only to demonstrate again that as advances were made the horizon was extended even further. What will come in 1960 and beyond is anyone's guess but even the most optimistic observer may well find his predictions short of actuality.

Lyrics by everyone

An indication of the status achieved by an industry can always be found in the progress it has made in terminology, standardization and specifications. Prosaic though they may appear, these hard won agreements are fundamental to understanding, use or application and are a prerequisite to progress. With the beginning of a new decade of opportunity it may be useful to review some of the developments in these areas, for they are gaining momentum in direct proportion to the advances being made in the general field. They are important and interrelated, for terminology is necessary for the understanding of standards,

(*continued on page* 84)

thanks to *automatic* xerography...



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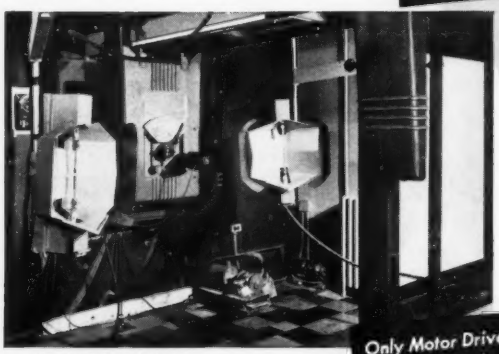

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MICROREPRODUCTION

(*continued from page 82*)

while standards are essential if specifications are to have meaning.

In the early days it did not greatly matter what name was given to the whole or part of any camera, process or development so long as the relatively few individuals concerned could understand each other. Terms were borrowed liberally from motion picture and other photographic fields as well as from library, office, industrial and other sources. Inevitably these terms came to have special meanings not contemplated in original usage. A few lists of special terms were published in articles and books and some even migrated in the direction of the photographic and general dictionaries.

In 1954 Mr. Hendrix TenEyck accepted an assignment to develop a glossary that would cover the field of microreproduction. With the assistance of several collaborators he produced the following year a *Glossary of Terms Used in Microreproduction* (published by the National Microfilm Association as an 88 page booklet containing about 350 definitions.) It has proved to be a most useful list and has performed excellent service in helping to insure a measure of uniformity in the field.

The field continued to expand and while the *Glossary* was being considered for revision it was learned that the Signal Corps was interested in providing a new military handbook which would become a uniform glossary of technical and photographic terms for use by the Department of Defense. The work was undertaken at Fort Monmouth, N. J. under the general direction of Mr. R. L. Maher. Some 6,000 definitions were gathered. Screening and combination reduced these finally to 3,289 entries. These were reproduced in 507 pages of mimeographed material, and given limited circulation for criticism. It is expected that the completed *Glossary of Photographic Terms (Including Reproduction)* will be printed by the Government Printing Office in 1960 and will then become available to the interested public at a price yet to be announced. —THE END

MICROFILM BIBLIOGRAPHY

A limited number of copies of Mr. Tate's annotated bibliography of information on microfilming is still available without charge. To get your copy send a stamped, self addressed envelope to MICRO LIST, PMI, 33 W. 60th Street, New York 23, N.Y.

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Rx PHOTOGRAPHY

(*continued from page* 51)

However, as in most fields, you can't please everyone. Films which are favorably received by one group of doctors are just as likely to be criticized by another group. If the sponsor wants something in the film which may be resented by the American Medical Association or the American College of Surgeons it is just not done, even if the contract is cancelled as a result. One of the greatest assets a medical film group can have, according to Sturgis, is the good will of the medical profession. This is gained not only by producing ethical, accurate films but by having an understanding of how doctors think and a knowledge of the medical field itself.

Medical training helps

While medical training can be invaluable, it is not a requisite if the cameraman has a basic knowledge of anatomy, medical terms and the current practices of the profession. The photographer often has to convince a physician that his way of working may be quite efficient, but it just won't photograph. For example, some surgeons dislike cleaning up the working area just for the camera. Yet, unless they do, the center of interest can be obscured by the surrounding clutter. If persuasion fails to change the physician's mind, the first rushes will.

The relationship between photographer and doctor may be described as one of respectful familiarity.

The permanent Sturgis-Grant staff numbers 17, including Warren Sturgis, who still does some of the actual filming. Assisting is Sid Milstein, VP in charge of production, who joined the company in 1950 and who taught courses in films at City College of New York and Columbia University. General supervision over business affairs is under Ben Magnes, a former TV producer. Other key people include Tony Delmar, Art Director, Dick Kent, Special Assistant to Sturgis, who doubles as account representative and cameraman, Herb Leventhal, Assistant Cameraman and John Monroe who is the general studio assistant. The actual duties are more varied than the nominal titles would suggest. Leventhal, for example, can handle editing and recording, which can also be done by Sturgis or Milstein.

(*continued on page* 86)

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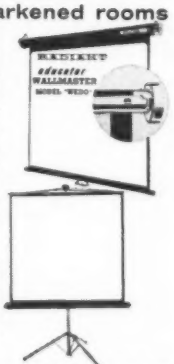

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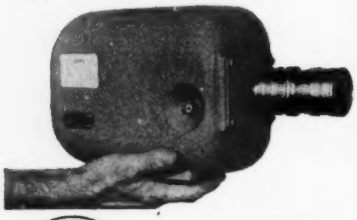

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Get more information. Circle 515, page 93

Rx PHOTOGRAPHY

(*continued from page* 85)

Mainstay of the studio is the 16mm Mitchell, equipped with a set of Baltar lenses—15mm, 25mm, 35mm and 75mm. This camera is used for both sync-sound and silent filming. Also on hand is an Arriflex with a Pan-Cinor Zoom lens and a 4-in. Micro-Kilar which has a focusing range from 8 in. to infinity. This lens is extremely useful in photographing specimens or copying transparencies on movie film. Two Cine-Kodak Specials, one with a special four-lens turret (made by Par Laboratories, Calif.) the other with a set of Kodak lenses from 25 to 100mm, are on the equipment list. The Cine-Kodaks are used for quick shooting on location, or for filming surgery.

Intraflex camera for cavities

An unusual camera is the Intraflex, a 16mm movie camera built by Guild Laboratories, Calif., which can photograph the depths of small cavities, as in the mouth or chest. A prism and mirror system directs the illumination through the lens, so that wherever the lens goes illumination goes too.

An Oxberry animation stand and camera are used to photograph all the art work for the film. The camera is handled by Larry Quartararo. Animation is useful in showing what actually happens during a procedure, something which is often impossible to photograph.

Various still cameras, ranging from a Leica IIIf and Rolleiflex to a 4 x 5 Master View are also on hand. They are used to shoot production stills, record shots, stage set-ups, slides and filmstrips.

Sound recording is done on a Magnasync (16mm sprocketed tape) or a Magnacorder (¼-in. tape) with a Rangertone sync signal. Sturgis-Grant only does raw recording; the rest of the sound operation is handled on the outside.

Processing goes out too

The use of outside facilities occurs not only with recording but with film processing as well. The reason is that the intermittent work loads at Sturgis-Grant would make a permanent printing set-up uneconomic unless they were to go into competition for business against other commercial labs. This way, they can order only what they need when they need it.

Color release prints are gen-

(*continued on page* 88)

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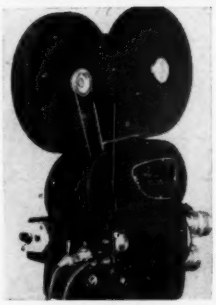

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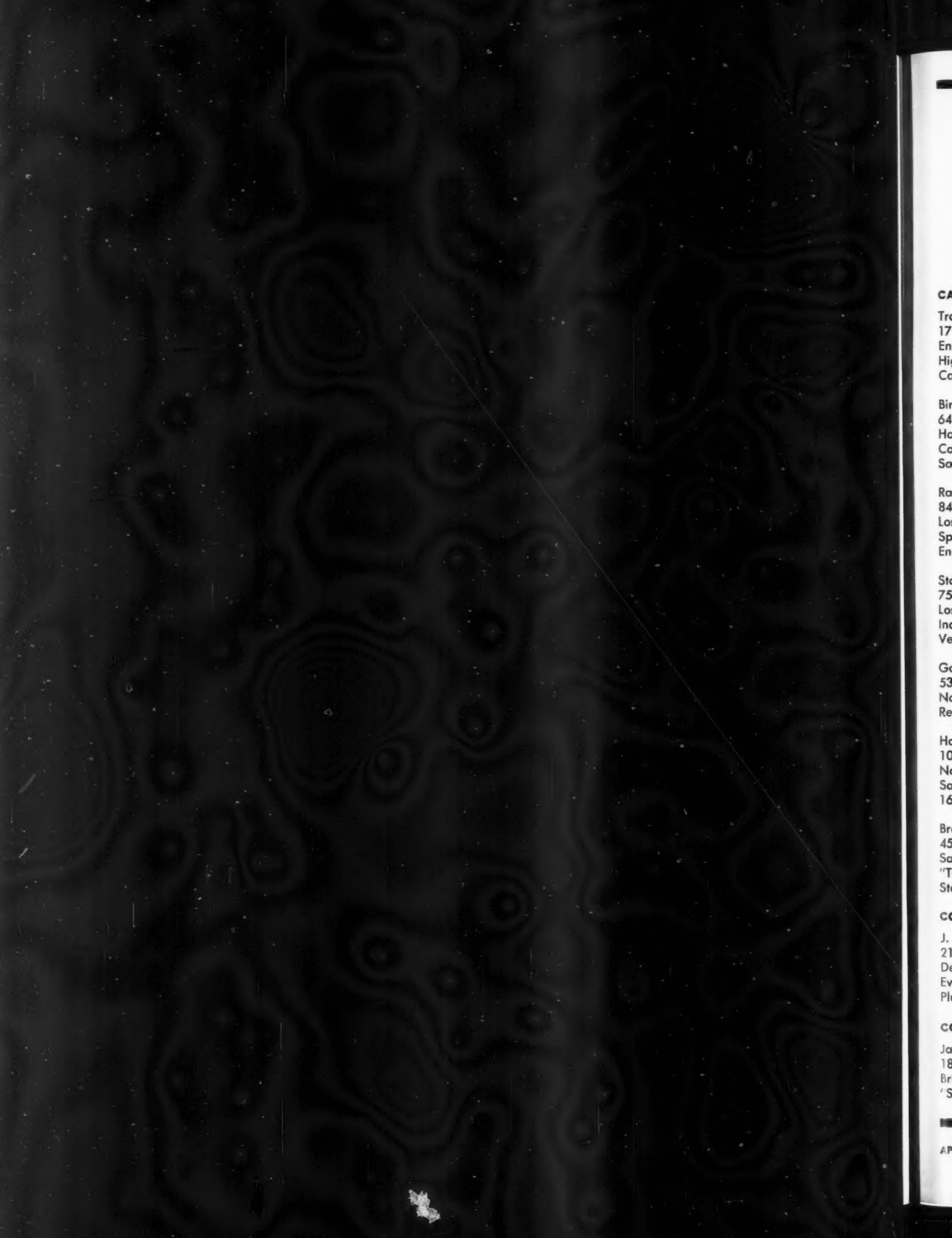

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Rx PHOTOGRAPHY

(*continued from page* 86)

erally made by Color Service or Consolidated Film Labs. Black-and-white processing is done by Lab TV, Video, Mecca and Precision labs.

The film used varies with the situation. All surgical and most clinical films are photographed in color, generally on Eastman Ektachrome Commercial although Anscochrome is used too. Black-and-white footage is shot on Plus-X or Tri-X, either reversal or negative. Slide films are photographed on 4 x 5 Ektachrome, then put on 35mm Eastman Color Negative for printing. This permits making multiple prints; some slide films are released in editions up to 100 prints.

The number of prints of films varies according to the audience planned for the film. A surgical film designed for viewing by a specialized audience may have only three or four prints. At the other extreme is a movie shot in 1949 for the American Cancer Society which has had 1400 prints made so far.

Production stills are shot on Ektacolor which can be printed either in color or black-and-white. This replaces Plus-X-Ektachrome combination formerly used. The result is a saving in time and materials; one negative and camera can do the work of two. Still work is processed by Modernage.

One of the problems at Sturgis-Grant is portable lighting for use on location. They use reflector floods for simple set-ups, such as when filming a patient in a hospital. However, for more elaborate locations set-ups ColorTran units and Masterlights are used. For studio work BM 2000-watt spots and smaller Keg-lites provide the illumination.

Equipment must be compact

The major technical problems in medical photography stem from the limited amount of equipment which can be used on location, yet which must be able to produce results equal to studio footage. The lighting must be carefully planned so that every part of the operating room, for example, will have bright enough lighting for color, yet without any of the lights shining into the camera lens. The cameras must be placed in such a way that they can cover the procedure completely yet not interfere with the surgeon or his assistant.

Typical of the preparation required for a medical film is the planning for *Resuscitation of the Newborn*. There were conferences with the doctors on the basis of the approved script, to find out just what they were going to do at all times. The delivery room was investigated to choose the best angles for shooting and to figure out the lighting.

For this film four ColorTran units were used—two Super Kickers and two 300-watt Masters which were boosted to 3200K. Two cameras were used, one manned by Sturgis, the other by Milstein. One, the Arriflex, had a 17½mm, wide-angle lens, among others, while the second, the Cine-Kodak Special, had a long-focus lens for use in close-ups.

After the set-up: the long wait

When all the technical preparations were made the crew remained on call in the maternity ward over a ten-day period, photographing any delivery where the attending physician expected the baby would be in difficulty. Many cases suitable for the film were thus picked up, but it was only at the end of the ten days that a severely depressed baby was delivered. Its resuscitation proved to be the climax of the film as finally edited.

The actual filming was at f/3.5 on Ektachrome Commercial at 24 fps. Exposure in cases like this must be absolutely correct since color plays a major part in diagnosis. Any color distortion due to under or overexposure could nullify the usefulness of the film. Blood color, for example, must be exact.

Release prints were made from an Eastman Internegative on Eastman Color film. One hundred thirty five prints have been made for wide distribution of this teaching film.

There is no magic formula for medical motion pictures. Technical skill must be the starting point since often subjects can be photographed only once. But with technical skill must come understanding of what the doctor is trying to do, what the sponsor is trying to say and of how the final picture will look to an audience. Next add a basic knowledge of anatomy, medical terms and hospital procedures (operating room asepsis, for example, must be scrupulously observed). Last, but by no means least, there must be a scientific detachment and an absence of squeamishness. This, then, is the prescription for a medical photographer, a specialist's specialist.—

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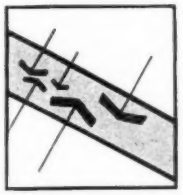

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Thomas J. Valentino, Inc. 36-page catalog *Major Mood Music Library* for television, films and audio-visual presentations.

SLIDE PROJECTORS **205**
Genarco, Inc. 4-page audio-visual catalog No. 297 describes equipment manufactured by this firm particularly the 3,000-watt slide projectors for 3¼ x 4-in. slides and electric slide changers. Includes prices.

CAMERA & LENS

TIFFEN OPTICAL BOOK **207**
Tiffen Optical Co. 16-page booklet describes the optical facilities at Tiffen.

GOERZ LENSES **208**
C. P. Goerz American Optical Co. New publication gives the facts on the Red Dot Artar and other Goerz lenses.

TRAID TECHNIQUES **209**
Traid Corp. 4-page publication illustrating some applications of photo instrumentation equipment in the field.

SINAR VIEW CAMERA **248**
Karl Heitz Inc. Illustrated folder describes the Sinar view camera.

SLIP-SYNC SYSTEM **210**
Chadwick Helmuth Co. 4-page brochure describes the Slip-Sync system for vibration test studies. System utilizes a pulse camera and the Chadwick Helmuth Slip-Sync which slaves strobe lights and camera to the shaker—creating a slow motion effect automatically and continuously.

MICROSCOPE CATALOG **211**
American Optical Co., Instrument Div. 24-page catalog of Microstar microscopes and accessories including 35mm and a 4 x 5-in. camera for photomicrography.

ENDOSCOPIC PHOTOGRAPHY **212**
Joseph D. Brubaker. Bulletin outlines Mr. Brubaker's manual, *Endoscopic Photography Through Endoscopic Telescopes.*

EQUIPMENT

CAMERA STANDS **213**
Modern Builders Hardware Co. Illustrated pamphlet gives specifications of the new Majestic camera stands and accessories.

CAR-TOP PLATFORM **214**
Carter Mfg. Co. Catalog sheet gives specifications of the CarPac, full length car top platform capable of supporting a cameraman and his equipment.

OPTICAL MEASURING INSTRUMENT **215**
Simpson Optical Mfg. Co. 4-page brochure describes the Vernac direct-reading optical measuring instrument for use on machining tools.

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TEMPERATURE CONTROL 244
Oscar Fisher Co., Inc. Illustrated specification sheet describes the Oscar Fisher temperature control which is said to maintain constant control to within ½°F.

HERCULES TRIPODS 245
Quick-Set, Inc. 4-page illustrated price sheet gives specifications of the Hercules industrial tripods and their accessories. Includes a Lo-Hi unit which drops the camera to floor level for low angle shots.

PRINT WASHER 246
A. J. Ganz Co. Illustrated card describes the DeHypo turbulator print washer which is said to convert a sink or tub into an efficient print washer. Includes price.

HERSHEY SUN LITES 247
Hershey Manufacturing Co. Catalog sheet describes the Hershey Sun Lite electronic flash units including the new Hi-Pro.

GRAPHIC ARTS

TECNIFAX DIAZO PROCESSER 225
Tecnifax Corp. Illustrated brochure on the new 54-in. ammonia developing diazotype processing machine for high output.

PLANETARY CAMERA 226
Remington Rand Div. of Sperry Rand Corp. Catalog sheet describes the Film-a-record 35mm Engineering Model Microfilm Camera. Power driven unit has positions for reductions of 12X to 29X.

INDEX MICROFILM RECORDS 224
Recordak. 10-page booklet, *How to Index Your Microfilm Records for Maximum Retrieval Efficiency.*

DITTO MASTERFAX 227
Ditto, Inc. 8-page brochure explains the use of the new Ditto Masterflex machine. The new unit is said to be capable of making a spirit master in 15 sec. without typing; making offset masters, making facsimile copies and laminating papers for protection.

A. B. DICK PHOTOCOPIER 228
A. B. Dick Co. illustrated brochure describes the new Photocopier machine for office copying. Includes specifications and list of A. B. Dick photocopy supplies.

GUIDE TO KODAK PLATES 229
Eastman Kodak Co. A handy reference guide wall chart lists the complete line of Eastman Kodak Co. photographic plates and a 6-page pamphlet, *Physical Characteristics of Kodak Glass Base Plates.*

MICROFILM STORY 230
Filmsort Div. of Minnesota Mining & Mfg. Co. 8-page article describes how Air Materiel Command uses microfilmed engineering data at Wright-Patterson Air Force Base.

PLATEMAKER BULLETIN 231
NuArc Co., Inc. 4 page illustrated bulletin gives prices and specifications of the NuArc Flip-Top platemakers, units which combine arc lights and vacuum frame in one machine.

MOTION PICTURES

LEASING PLAN
S.O.S. Cinema Supply Corp. 8-page industrial leasing plan booklet discusses the advantages of leasing motion picture production equipment. Send requests on company letterhead.

DYNAFAX CAMERA 234
Beckman & Whitley, Inc. Specification sheets describe the Model 326 Dynafax Continuous Writing Camera for motion analysis and velocity study

EQUIPMENT CATALOG
National Cine Equipment, Inc. 22-page illustrated catalog If 16 and 35mm motion picture and television equipment. Send requests on company letterhead.

PROCESSING MACHINE 235
Houston Fearless Corp. 4-page brochure describes the Houston Fearless Labmaster line of 16 and 35mm film processors for black-and-white negative-positive, reversal and microfilm stock.

RENTAL CATALOG 236
Birns & Sawyer Cine Equipment Co. 32-page rental catalog No. 3 includes cameras, editors, lights and other related accessories offered by this Hollywood firm.

FILM SPLICING 233
Hollywood Film Co. 4-page brochure gives specifications of the HFC Automatic Tape Splicers for repairing or splicing 16 or 35mm perforated film.

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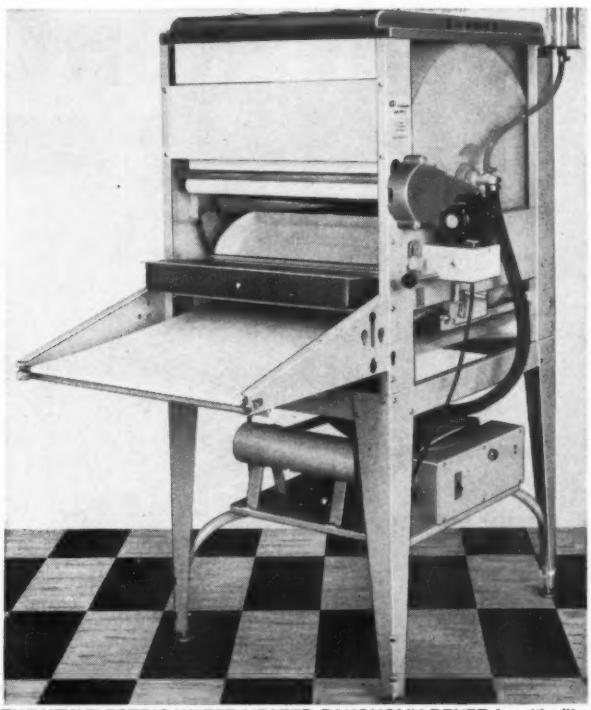

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SERVICES

COLOR STOCK LIBRARY 237
Lem Bailey Productions. 4-page price folder includes over 60 categories on which this outfit has extensive coverage.

COLOR FILM DUPLICATING 238
Frank Holmes Laboratories, Inc. 8-page brochure describes the color slide and filmstrip duplicating services offered by this San Fernando, Calif. lab.

COLBURN LABORATORY 239
Geo. W. Colburn Laboratory. 12-page brochure describes the motion picture, slide and filmstrip services offered producers by this Chicago firm.

SERVICES TO PRODUCERS 240
Cinema Research Corp. Illustrated brochure describes the services offered motion picture producers by this Hollywood outfit—processing, printing, titles, consultation, etc. Includes prices.

MOTION PICTURE PROCESSING 241
General Film Laboratories. 16-page illustrated booklet describes the complete motion picture color processing services offered by this Kansas City and Hollywood outfit.

PHOTOGRAPHY COURSE 206
Rochester Institute of Technology. 12-page pamphlet outlines degree programs of the Department of Photography at RIT.

BYRON FILM SERVICES 232
Byron Motion Pictures. 24-page booklet explains the variety of services offered to motion picture film producers by this Washington, D.C. firm.

SUPPLIES

SUPER ANSCOCHROME 6500 242
Ansco. 4-page color brochure gives the data on Ansco's new Super Anscochrome 6500 (6500K) sheet film for electronic flash exposures. Film has an e.i. of 100.

STATICMASTERS 243
Nuclear Products Co. Illustrated brochure describes the Staticmaster brushes and ionizing bars for eliminating static electricity from negatives, slides and photographic equipment.

ANTI-STATIC FILM CLEANER 222
Electro-Chemical Products Corp. Illustrated folder describes the Ecco No. 1500 anti-static film cleaner which contains no carbon tetrachloride and also Speedrol applicators for cleaning 16 and 35mm film.

FILM SPEED BOOKLET 220
Carl Zeiss, Inc. 12-page film speed booklet lists exposure indexes of European photographic films as well as the American brands. A conversion table for transposing film speed values from differing systems is included.

PROMICROL 216
Malcolm B. Dias. Price sheet for Promicrol film developer and Promicrol replenisher.

LIQUID NEOPRENE 217
Pro-Chem Co. Specification sheets describe the Pro-Chem liquid air-curing neoprene protective coating which may be suitable for the lab or darkroom.

DARKROOM TIPS 218
Peerless Photo Products, Inc. Handy chart suitable for wall hanging lists many causes and preventative measures for print problems, from Abrasion to White Spots.

SILVERCEL BATTERIES 219
Yardney Electric Corp. 8-page bulletin describes the Silvercel batteries for aircraft installations where miniaturization is an important consideration.

CHEMICAL CATALOG
Philip A. Hunt Co. 48-page catalog of Hunt Photographic and Graphic Arts Chemicals. Includes prices. Requests for this publication must be made on company letterhead.

PHOTO BOOK CATALOG 223
Amphoto. 26-page catalog of photographic books includes subject and title index.

PERMAFILM TREATMENT 221
Permafilm, Inc. 2-page reprint from the *SMPTE Journal* entitled *Lengthening the Life of Film,* deals with cleaning and impregnating emulsion with Permafilm.

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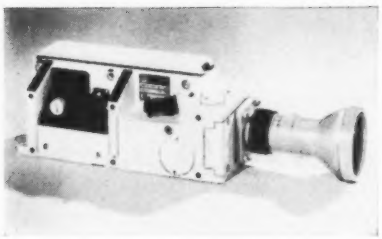
For additional information on any new product circle the appropriate number on the readers' service card, page 93.



70MM PROJECTOR **102**
An automatic pulse projector for studying 70mm negative or color positive perforated roll film has been announced by Charles A. Hulcher Co. Inc. The unit may be operated frame by frame or automatically advance the film at sequence speeds up to 20 frames per second. The roll may also be reversed and stepped backwards for restudying individual frames. The unit has a 100-ft. film capacity using standard No. 10 spools. Greater capacities are available on special order. The unit employs a 1000-watt lamp.

FLIP-TOP PLATEMAKER **103**
A new small size flip-top platemaker for 13 x 18-in. plates has been recently introduced by the NuArc Co. As in all flip-top platemakers, the vacuum frame is on top and flips over to face the carbon arc lamp built into the base. Price: $345 with automatic control; $295 with manual control.

CAMERA HOUSING KIT **104**
A finish-it-yourself underwater camera housing kit featuring pre-assembled plexiglas box has been announced by Underwater Specialties Co. The body is said to fit almost all popular 35mm cameras and comes with an extra supply of ¾-in. plexiglas, cement, solid brass controls and an "o" ring to finish the housing to suit the users requirements. Price: $37.50.

SHUTTER TESTER **105**
A new improved Model 104 shutter tester has been announced by Aerotronic Associates, Inc. This instrument is said to test camera shutter speed from 1/1000 to 1.0 sec. All controls are located on the sloping front panel and the scale selection switch is of the direct-reading type.

TRAID CORP. LENSES **108**
A line of telephoto lenses with focal lengths ranging from 4 to 24-in. has been announced by Traid Corp. This series of Pantel lenses is said to be available for 16mm, 25mm and 70mm cameras. Traid has a rental-lease program which enables the facility with a one-time application to rent one of these lenses rather than purchase it outright.

All optical surfaces are coated with magnesium fluoride anti-reflection coating, and metal surfaces are anodized. Heavy duty support brackets are recommended for use with lenses over 10-in. focal length.

Traid has also introduced a wide-angle lens with 165° field of view, designed especially for mating with the Photo-Sonics 16mm-1B high-speed camera. The lens is f/1.9 with f-stops from 1.9 to 16.

PROJECTION POINTER **117**
A simple press of a button is said to cast a brilliant, sharply defined, non-spilling, contrasting arrow image over long projection distances, with the new Ednalite Projection Pointer. The unit operates on ordinary 115V AC house current in conjunction with a 7V AC transformer which is built into the carrying case. The unit is supplied with 15 ft. of detachable line cord. Price: $69.50 complete with case.

EPOXY REPAIR KIT **118**
A new epoxy-polyamide chemical compound, Plastic Mastic, is an all-purpose general repair material for almost every

(*continued on page* 98)

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MPDFA

MPDFA is a little hard to pronounce as magic words go, but it is the secret which unlocks the photographic industry's treasurehouse of new cameras, equipment and miscellaneous baubles connected with man's attempt to record by light.

Once a year, the Master Photo Dealers and Finisher's Association (to give the group its full name) holds a show at which the newest products for the American photographic consumer are unveiled. Some of the newest products are open secrets while others are really surprises, brought from under the counters ten minutes before the show closes.

It is, for want of a better term, a world's fair of photography, with items from virtually every major (and minor) photographic manufacturer in the world. The purpose of the show is to sell the men who sell the public.

Within a few weeks of the show, the new products will be on the shelves of dealers. These products are not designed for only one group of photographers in mind, ranging from automatic box cameras to new professional lab equipment.

In this report, we will concentrate on products which are designed for the industrial or professional market, plus some items which might be of interest to photographers in general. If there is anything which looks very interesting to you, remember that you can get more information by writing the manufacturer or distributor or by visiting your local dealer.

This year's show does not have the impact that the 1959 show had when the single-lens reflex arrived. There are not many new products in the taking end of photography. Many cameras were introduced during the past year and are making their formal debuts here.

Time and space limitations do not permit a complete listing of new items but mention should be made of the show's "star"—8mm sound-on-film. Now largely for the amateur market, it is quite possible that as improvements are made, industry will find a use for this system.

Some of the most attractive items at the show are in the "not available" or even less tangible "don't quote me, but—" categories. Heading this list is a 2¼ x 3¼ Linhof Color Camera, a monorail model similar, we suspect, to the current 4 x 5 model. No details were available but price is in the $200 range.

Also on this list is a Konica F single-lens reflex of unusual design. The shutter is a focal plane with speeds to 1/2000 sec. but instead of starting at one end (either top or side), the shutter opens from top *and* bottom. The action is very much like a pair of elevator doors; in effect, the six vanes of the shutter open from the middle. The practical effect is that the high speeds of the focal plane shutter are available, plus the ease of synchronization and freedom from distortion found in leaf-type shutters. M sync goes to 1/2000, X sync to 1/125. Equipped with a 52mm f/1.4 Hexanon lens and all possible reflex refinements, the Konica F will sell for about $380. This camera also has an electronically coupled meter (instead of mechanical coupling) using the principle of a Wheatstone Bridge and a pressure plate which is automatically lifted during film transport. The theory here is to reduce the possibility of scratches and abrasion.

A camera which was a whatever-happened-to-it item made its final debut here, the Zeiss Contarex. Selling for $400 plus, it comes with a 50mm f/2 Planar. One change since its first debut; there is an instant return mirror.

The single-lens parade continues with assorted new recruits including two new Minoltas, the SR1 and SR3. Of particular interest to industrial users is the introduction by Minolta (for use with the SR3) of an electronically-controlled remote control unit, a universal micro-photo unit for photomicrography and a photo oscillograph.

Another recruit is the Yashica Pentomatic with the 55mm Auto Yashinon f/1.8. The Praktina 2A with Zeiss Jena (East German) Flexon lenses replacing the former Biotars was also officially introduced. This camera is now fully automatic. One flash outlet is used for both F and X sync instead of the two found on the previous model.

The Camerz system was also officially introduced to the photo market. This is a pair of rugged camera bodies, the Model 10 and 20, plus assorted magazines and accessories to adapt these two cameras for service where minimum adjustments and

1960's photographic equipment gets its send-off at the Master Photo Dealers and Finisher's Association Convention. This year the MPDFA saw new 8mm sound equipment, a 1/2000 sec. focal plane shutter, a new Microdol and Tri-X, a lighter and fancier Weston Meter, some nice improvements in old standbys and many others mostly "unavailable" at show time

maximum film loads are desired. Various tripping devices—from a single-action release lever to special solenoids—are available. Film capacity varies from 345 exposures on 100 ft. of 70mm film to 1,750 exposures on 200 ft. of 35mm. Perforated or unperforated 35mm, 46mm and 70mm film in 100 or 200-ft. lengths are used. Electric models can be cycled at 1 fps on 35mm to 1 frame every 2½ sec. on 70mm. Lenses are 127mm Wollensak Raptars in special heavy duty shutters.

Among new accessories is the Rollei Micro Attachment, an adapter to permit the use of Rolleiflex cameras on microscopes. A beam prism is used to focus the microscope while the camera is in place. Also in the works for Rollei is a prism finder which will give a 1:1 unreversed image using a double-coated prism for maximum brightness. The finder can be used on any Rollei with detachable hood (T, E, F, E2, etc.). Price will be in the $70 class.

A prism finder for the Zenza Bronica is to be available shortly, permitting eye-level finding and focusing.

New Leica accessories include a Universal Copying Stand for reductions of 1:1, 1:1½, 1:2, and 1:3. A close focusing device for the IIIG is now available as is the turret for M models. The latter was shown before but was not available until now. It takes three screw-mount lenses—35, 50 and 90mm.

The new Weston Model IV exposure meter made its debut. Featuring a lock button and a redesigned dial, it is said to be twice as sensitive as the III and still and cine dials are interchangeable. Price, with incident light attachment, is about $35.

Heiland offers a Repronar copy stand to copy color transparencies. The camera can be moved so that only the desired part of a transparency can be copied on the full frame.

Kodak pulled a surprise with new Microdol-X, an improved fine-grain formula for greater acutance. The negative image has a slightly brownish tone which gives, according to Kodak, about 5 per cent greater printing contrast than an image developed in D-76 to the same visual contrast. For maximum sharpness Kodak suggests 3:1 dilution with medium speed films. Microdol-X will be available in May.

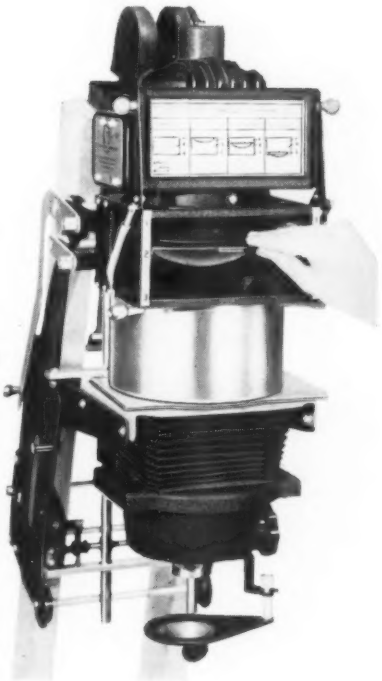
Tri-X Pan, an improved version, was introduced by the people from Rochester. Chief improvements are said to be finer grain and improved image quality. Development times are shorter, too.

Beseler is showing a new dryer, the 1217K, featuring internal improvement over the previous model.

Welch has improved the 3836 Densitometer, the 3836C, to permit the use of sharper cutting Wratten No. 92, No. 93 and No. 94 filters instead of filters formerly supplied. According to the manufacturer this set provides more accurate information for quality control of color print material. Color density readings to 2.5 are said to be easily obtained with this instrument. Price is $420. The reflection head, No. 3832C, may be purchased separately but the amplifier and Blue Probe unit must be returned to the factory for matching.

Also on the "not available" list is Gevaert's Gevagam, a cold-tone variable contrast paper.

New darkroom items include Omega's Variable Condenser D-2. Three condensers are used, one pair which is fixed, plus a moveable upper condenser which is raised or lowered to change the focal length of the condenser system to fit the lens used. This permits interchangeable lenses without requiring different condensers. The condenser head is available for older D-2s.



NEW PRODUCTS

(*continued from page 95*)

known material such as concrete, metals, wood, ceramics, glass, rubber, cloth and paper products, etc., according to the manufacturer, Williamson Adhesives, Inc. The compound is available in quart, ½-gal. and 2-gal. size kits. Each kit consists of two cans of equal size; one can contains the base, the other the hardener. Cured compound is hard to touch in 4 hours, can be walked on in 8 hours. Curing time may be speeded up by the heat.

PERSONALIZED SLIDE MOUNTS **119**
Admaster Prints Inc., now offers personalized slide mounts for industry with company name or imprinted with company trade mark or logo. This service is available for all slide mounts including 35mm, 3¼ x 4 lantern slides and overhead projection mounts. It is said that this service is available at no extra cost.

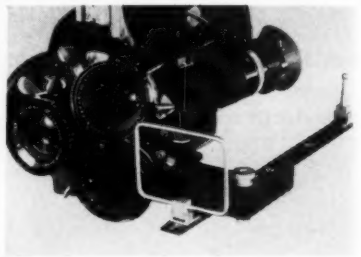
AGFA 8MM SOUND PROJECTOR **120**
A new projector for 8mm sound or silent movies has been introduced by Agfa, Inc. It consists of the new Sonector-8 projector and either of two attachments. One, a special base unit with a sound head for transcription and synchronized playback from a magnetic sound track on the film itself. It is called the Sonector-Phon. The other, called the Synchrovox, enables the amateur cinematographer to transcribe sound on his own tape recorder and synchronize it with the action in his movies. Price: $299 with Sonector-Phon.

HEYER SCOPE **111**
An all-purpose scope that is said to provide the proper surface and light for drawing, lettering, ruling and writing on all stencils, spirit and gelatin masters and paper offset plates has been introduced by the Heyer Corp. Named the Superscope, this device features an adjustable light which can be placed in any position over or under the 10 x 18½-in. ceramic diffusing glass. A clear plastic, locking T-square and spring steel clamps hold stencils in place. Price: $29.50.

ROLLEI MICRO ACCESSORIES **113**
A Micro Tube, Micro Prism and some bayonet adapters which permit precise mounting of any Rollei camera to any standard (25mm) microscope tube has been announced by Burleigh Brooks Inc. Viewing may be done in several ways: using the Rollei's own reflex finder, the groundglass back (with plate adapter), or the new right-angle Micro Prism. Prices: Micro Tube, $9.95; Micro Prism, $64.95; Bayonet adapters, $2 each.

SPRAY ADHESIVE **114**
An adhesive spray for mounting photographs and graphic art material has recently been introduced by the John G. Marshall Mfg. Co. Inc. The thermo plastic spray is used to coat the back of the photograph, allowed to dry and then permanently fused by the application of moderate heat for 8 sec. A 16 oz. can is said to handle over 100 8 x 10 prints. Price: $2.25.

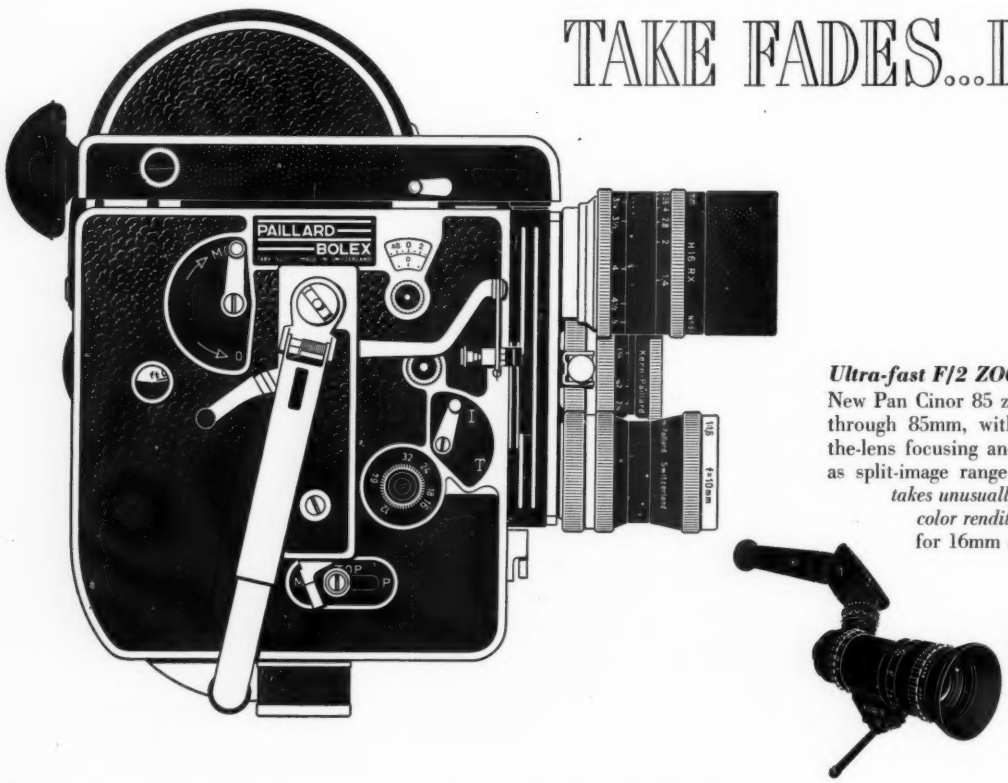
TARGET FINDER **110**
An open frame tracking finder for Arriflex cameras facilitates framing fast action subjects according to Birns & Sawyer Cine Equipment Co. The light-weight target sight is adjustable for both 25mm and



50mm lenses. The assembly mounts to the camera by means of a pistol grip or other tripod stud. Price: $49.50.

105/35MM CAMERA-PROJECTOR **109**
A new camera-projector capable of utilizing both 105 and 35mm film has been introduced by Keuffel & Esser Co. This unit is said to be the first planetary camera with a subject area of 44 x 64 in. It has an automatic control of point source light; motorized magazine which changes negatives instantly and automatically and a motorized filter built into the optical system. The projector is said to hold 35mm roll film under vacuum during exposure.

This is said to be the first camera of this type which utilizes both 105 and 35mm features in a single unit.



TAKE FADES...LAPS...

Ultra-fast F/2 ZOOM LENS
New Pan Cinor 85 zooms from 17mm through 85mm, with reflex through-the-lens focusing and viewing as well as split-image range finder. *This lens takes unusually sharp detail and color rendition.* Has C-mount for 16mm cameras. $420.00.

All prices include Federal Excise Tax where applicable.

Get more information. Circle 493, page 93

BRAUN PROJECTOR REPAIRS 112
Strauss Photo-Technical Service, Inc. has been appointed by Braun Germany as the American service representative for their Braun slide projectors. Complete parts, including slide trays are said to be available.

MUSIC LIBRARY
A basic 20-hour library of music for films, contained on 100 reels of 15ips magnetic tape and fifty corresponding 12-in. LP Vinylite reference discs, is now available from Capitol Records, Inc. The basic library can be obtained on a lease arrangement. A sample 45 rpm record will be sent to all who send in requests on company letterhead.

LO-HI TRIPOD ACCESSORY 115
A Lo-Hi accessory unit for the Hercules Tripod has been announced by Quick-Set Inc. The unit is said to permit lowering the camera to the floor or raising it to maximum height by means of an elevator mechanism. Price: $85.

HOT SPLICERS 116
Portable hot splicers for 35mm and 16mm film, formerly distributed by the Bell & Howell Co. under Models 198A and 198B are now distributed exclusively by Traid Corp. of Encino, Calif. These splicers cut, splice and weld in one action, are portable, and "A" or "B" rolls may be spliced without turning. The unit has full-fitting pilot pins and "life-time" carbide scraper. Low visibility splices on the frame line are said to be the natural result.

VISUAL RECORDING CAMERA 106
A camera which simultaneously photographs the operator's eye movements and the objective within the optical field of view (42° azimuth and elevation) has been announced by PAR Products Corp.

The unit has an electrical drive motor and weighs 4.5 lbs. 100 or 200-ft daylight loading spools of film may be used. A 28V DC motor drives the camera at 4 frames per second minimum.

MERCURY LAMPS 107
Replacement mercury lamps for nearly 100 different models and sizes of blueprint and whiteprint machines are said to be available from PEK Labs, Inc. These new lamps have increased structural strength and a special processing technique has been developed which eliminates internal metallic deposits which formerly caused shadows and irregularities, it is said.

FLASH FOR HIGH-SPEED PIX 101
An electronic flash unit for high-speed photography has been introduced by Beckman & Whitley, Inc. The new unit has a capacity of 1200-watt-seconds. It delivers a single flash of cold light whose duration is controllable to correspond with the writing rate of the camera. Waveform of the light pulse is said to be square to provide even illumination on all frames.

Duration settings are 8.70, 11.15, 14.75, and 22.25 milliseconds. Rise and decay

times of the pulse are in the order of 40 microseconds. Provisions are included so that the unit may be triggered from any of the following: normally open or closed switch, positive pulse, or photoelectric cell. A modeling light operates at 60 flashes per second for use in framing, focusing and light arrangements. Operation is from a 115V 60-cycle 5 amp integral power supply. The unit is said to meet the needs of cameras having shuttering speeds up to 1 microsecond.

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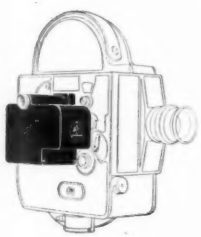

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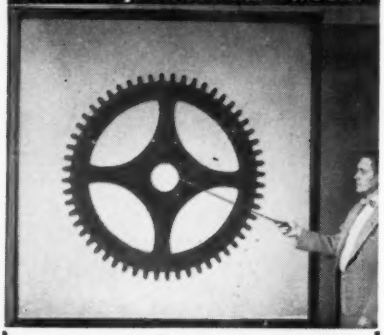

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TIME LAPSE

(*continued from page* 39)

growth of fungal hyphae also gave us some insight into how fungi can develop colonies at some distance from the original growth."

Basically, time-lapse photographic equipment consists of a camera, light source and an apparatus for making exposures at predetermined time intervals. The interval timers we use were made in our shop. They are easy to assemble and much cheaper than commercial equipment. Our basic interval timer is made from a few simple materials shown: A 115V 60C synchronized electric motor, two R-R12 microswitches (normally open), one 16-mm 50-ft. film spool to serve as the cam wheel, one duplex receptacle, about 36 inches of wire. Cost? About $6.50. With less than one hour of work, these bits of miscellanea can be converted into the timing unit shown. By interchanging motors of different speeds (they are available at the following rates: 1/2, 1, 2, 2 1/2, 5 and 10 rpm) and by varying the film spool cam units, it is possible to obtain at least 30 different intervals between exposures, varying from one second to two minutes. Then by going a step further and placing a gear reduction apparatus between the motor drive and the cam wheel, it is possible to select any interval.

The motors are purchased intact. The cam wheel, on the other hand, is made from a 50-ft. aluminum film spool, as illustrated, page 38. A film spool was originally selected because it was found that when two microswitches are placed together, they are spaced perfectly to roll on the two edges of the spool. The two microswitches control the lights and the solenoid that actuates the camera. The spool illustrated has two sets of notches 180° apart. This provides two exposures per revolution: with a 1 rpm motor, this would give exposures every 30 seconds; with a 10 rpm motor, every 3 seconds. The notches in the cam, which permit the switches to move to the "on" position can be adjusted so as to turn the lights on shortly before the camera-operating solenoid is actuated, thus permitting maximum illumination at the time of the exposure. The lamp switch can also be used as a switching circuit for strobe lights if desired.

In our work we have used three types of camera: Bell & Howell Model 240, Bolex H-16 and Bell & Howell 70DR. These are easily modified for solenoid actuation. The only modification is removal of the shutter button and placing an extension from the solenoid to the hole made available by removing the shutter button. If it is desired to operate the camera with time exposures, simply reverse the position of the solenoid and adjust the solenoid notches on the cam wheel to hold open the shutter for the desired time.

The actual photographic techniques are essentially the same as those applied to every-day motion picture photography, with the exception that you are working with single exposures at certain intervals rather than so many frames per second. We have recorded with conventional set-ups, through the microscopes, with extension tubes, etc. However, the individual photographer can best approach the problems of exposures, film types and lighting by actually working them out to his own satisfaction, for as in all instances of photographic recording individual film and lighting and exposures characteristics are required.

Although many problems exist in preparing a time-lapse set-up, the recording period and the final film analysis, it would be nearly impossible to mention all the pitfalls that occur. However, by benefit of failure and mistakes, we have discovered several important "musts" for a successful time-lapse study. Some of these are: camera stability, critical focusing (especially when using extension tubes), color temperature and longevity of the photolamps (it seems that photolamps have a habit of burning out during after-work hours). When working with color film over a prolonged period of time, unless steps are taken to maintain a reasonable constant temperature—the temperature changes may effect the color rendition considerably throughout a 100-ft. roll of film. Of the utmost importance is the handling of the completed film. The best method we have found is to have two prints made from the original. This can be expensive, but is worth it when handling important footage. With two copies, one can be used for repeated projection and the other for frame by frame analysis. The original can then be kept free from damage caused by handling.

The time-lapse program has been in effect at the Quality Evaluation Laboratory for almost three years. Although we have done considerable work with time-lapse, we have found no apparent end to its applications.—THE END

I.A.V.A.

(continued from page 61)

three were needed to attain the standard of five hours set in the program using the A-V device. Only three mistakes were made by the operator on the first run—thereafter there were none.

White concluded by stating advantages and disadvantages of the A-V system under discussion: Advantages: 1) Reduction of supervision. 2) Techniques requiring special care can be rechecked step by step for high reliability. 3) The technique clearly defines work problems in proper sequential steps. 4) Reduction in training time. 5) Each operation is paced. The disadvantages quoted were: 1) High preparation cost of A-V aid precludes use in short runs. 2) Operator limited by pace set by A-V cycle. "Fast" tape would be needed for exceptional operator. 3) High relative capital outlay i.e. over $5,000.

"**CLOSED CIRCUIT TELEVISION IN INDUSTRY,**" presented by David Snow, Hallamore Electronics. Snow impressed upon the audience the advantages of a plant equipped with CC-TV, which allows a close personal relationship between management and employers, when management makes semi-weekly reports or pep talks to employees assembled in cafeteria, when the plant's CC-TV camera shows important visitors touring facility. He also mentioned another use of CC-TV camera as aid in telephone ordering department of one plant where phone operator looks into TV screen, sees the whole office space at one glance and can report back to waiting phone caller: "No, Mr. Jones has left his desk, but Mr. Smith would be available. May I connect you with him?" One interesting use for CC-TV mentioned by Snow was the downtown Los Angeles office of the Bank of America, who have found it expedient (and cheaper) to move the mortgage files to low-rent district and equip file room with CC-TV camera and lights mounted on dolly. Upon phone inquiry from mortgage officer in high rent area office, operator in file room pulls required informational material and places it for remote immediate inspection in front of CC-TV camera, connected to mortgage officer's monitor TV set.

"**THERMOPLASTIC RECORDING**" an illustrated talk given by Ray Bonta of G.E. was received with very great interest. (For a full report see PMI, Feb. 1960.)

(continued on page 102)

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I.A.V.A.

(continued from page 101)

Metro Goldwyn Mayer Studios hosted IAVA for an afternoon, during which time the workshop group toured the various facilities of MGM's Industrial Film Division with a special emphasis on the matte painting department and the "Blue Backing Stage." Sample footage was shown demonstrating the traveling matte systems as used in MGM'S *Ben Hur, The World, The Flesh and the Devil* and others. The heads of the various process departments of the studio were at hand to answer technical questions brought up by the IAVA members. Mr. Petro Vlahos of the Motion Picture Research Council gave a lecture detailing the various traveling matte systems presently in use in the industry. The specially constructed process camera used for some of the traveling matte shots in *Ben Hur* came in for a lot of comment. This look behind the scenes is usually a pretty closely guarded secret of the various film companies.

"TOPICAL GO-ROUND" was a free wheeling exchange of experience by the members dealing with: "Report on color film": i.e. 16mm Ektachrome ER (SO 260 and 270) was reported to have outstandingly good yellows, less grain than other films with comparable speeds and considered an excellent tool but to be used only when needed. Since this material has higher contrast than Ektrachrome suggestion was to light flatter for High Speed Ektachrome film to allow for intercutting of both materials. Another subject discussed was ways to get salesmen to use A-V aids: Salesman must be convinced that A-V sells for him, research as to subject matter should be made on salesman's—not management level. Salesmen must be trained to know how to use equipment, equipment must be kept lightweight, since he is overburdened already, convince sales department of use of A-V aids, then they will ask for it, and end up using it.

UNIVERSITY OF CALIFORNIA, Dept. of Cinema, was visited one afternoon, with a showing of slides, pictures and film clips pertaining to UC, Dept. of Cinema's history from 1936-1960 and a discussion of the organization of the various classes. Since classes were in recess during the visit, the department could not be seen in operation.

All in all the three days of the IAVA 1960 Workshop were crammed with information of interest, of which space permits only a summary.

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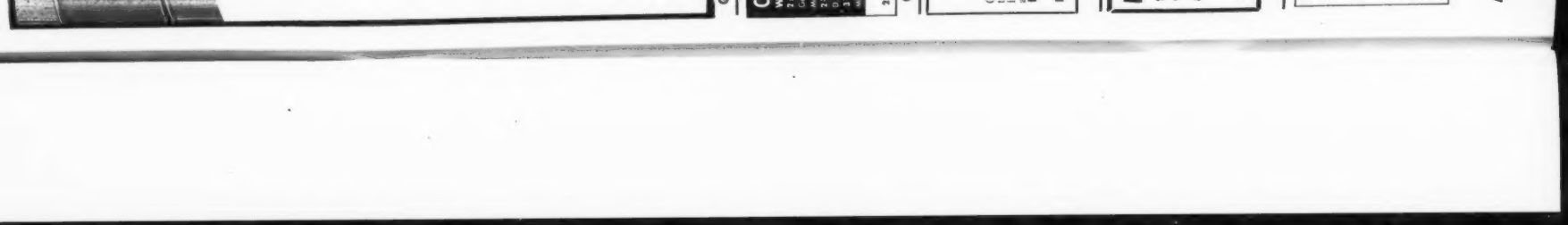

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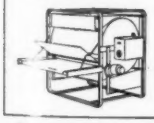

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(*continued from page 63*)

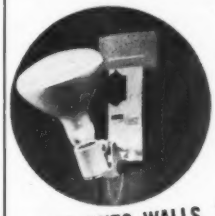
ratio and minimizes the intermodulation and tendency to print through that exists when two signals are on the same sound track. On the ¼-in. tape the sync signals are recorded on either side of the sound track in push-pull. Thus, "cross-talk" between the synchronizing track and the 220-mil sound track in the center of the tape is eliminated.

Thus, equipped, we could shoot sync-sound anywhere without having to depend on outside power sources. A crew of four men: director, cameraman, soundman and a general all-around assistant were able to film the show without difficulty. Equipment consisted of a 16mm Arriflex, an Arri Blimp, tripod, Perfectone recorder and accessories, batteries and Color-Tran lighting. In a fast two-week swing through the corn-belt we filmed interviews and general scenes on ranches, feed lots, stockyards, slaughterhouse coolers, offices, cattle pens and restaurants. Indoors or out, hot or cold (from 40 degrees in the meat coolers to 110 in the sun), under perfect or difficult accoustical conditions, in large open spaces outdoors or in tightly cramped interiors we captured sound and color film of top quality with set-up time averaging little more than 15 or 20 minutes, and with little more difficulty than that encountered in silent shooting.

Our "soundman" was actually a cameraman instructed in the use of the Perfectone, for it is no more difficult to handle than any other high quality tape recorder. The only serious mistake that can be made is to "overmodulate" the sound signal so that it goes "overboard" resulting in distortion. A lower signal can be raised in the re-recording but a distorted track can not be salvaged. A dialogue equalizer incorporated in the recorder swings the frequency characteristic so as to suppress 100 cycles about 15 dbs. and raise 6,000 cycles about 4 dbs. A VU meter installed on the side of the recorder (so that it can be read if slung from the shoulder) is also used to measure battery voltage under conditions of load. Both ear phone and loud speaker monitoring is available. During actual recording the soundman may listen to either direct monitor (what is coming in over the mike) or reproduce monitor (the signal actually recorded as it passes over the playback head a moment later). The small built-in loud speaker provides surprisingly good playback quality considering its size. External power

(*continued on page 104*)

THE NEW LOWEL LIGHT PAT. PEND.



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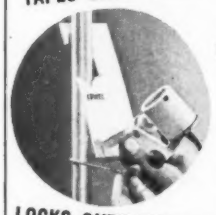

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Both extreme accuracy and super-sensitivity are required for on-the-easel "spot" measurements. No other type of measuring is as practical for quality projection printing.

Spot-O-Matic II, with a maximum sensitivity of .0036 candles and repeatability of plus-minus .01 density, fully meets these requirements, for both black and white and color, including readings through sharp cutting filters.

Spot-O-Matic II does the **easy** way what other devices selling for up to $1200.00 do the **hard** way. We use a super-sensitive **stable** photo **conductive** cell, a rugged neon glow super-sensitive indicator, two stable **fixed** resistors and NOTHING ELSE in the circuit.

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High cost devices use photo **emissive** tubes which require tremendous internal or external amplification. **Delicate** microammeters give the readings.

Among **low cost devices** only Spot-O-Matic II is completely calibrated—only Spot-O-Matic II has the stability of RCA cadmium sulfide cell **sealed** in metal and glass.

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200-250 Volt Model Available
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Get more information. Circle 472, page 93

IN-PLANT TEST

(*continued from page* 103)

amplification and large high quality loud speakers may be used with the unit. Output jacks using "banana pin" plugs are provided for this purpose.

We were also equipped with two "mixer modulators" so that two chest mikes (RCA BK6B) could be handled simultaneously. We also had a hand mike (RCA BK-1A) for close talking and a boom mike (RCA BK-5A) on a hand-held "fishpole" for general scenes where the mike had to be placed at some distance from the action. With the boom mike working through our modular mixer we found that the gain could be raised away up for distance sound and lowered as the action approached closer to the camera without introducing amplifier hiss or other distortions. Sound quality was excellent throughout regardless of conditions, mikes used, wind noise, accoustics or other factors. All in all, the equipment far surpassed our expectations and the resulting pictures possessed better sound quality than any previous location films made with regulation equipment. The superior sound quality, coupled with the portability, ease of operation and efficiency possessed by the Perfectone recorder belies its small size and simplicity of operation.

Sync pulse generator

A "sync pulse generator" will be available soon that can be attached to the shaft of any electric camera motor. The pulse will thus be generated by the camera motor itself and fed directly onto the tape. This will eliminate the invertor, control box and storage battery presently necessary to operate the regular 115-volt sync motor. Any camera that can be run by an electric motor (a governor controlled motor will work best) will be capable of shooting sync sound movies. For field use a 6 or 12-volt DC motor run off a light weight battery will do the job.

The Perfectone has solved all of our recording problems, both studio and location. In my humble opinion I believe it to be the ideal sync-sound recorder for the small industrial producer who must work with a small crew and a low budget on a tight schedule, yet must not sacrifice sound quality. Transfer facilities for furnishing 16mm and 35mm magnetic film or optical negatives are now available from Ryder Sound Services, 1161 N. Vine St., Hollywood, Calif., or Magnapix Inc., 105 E. 106th St., New York, N. Y. Transfer equipment will also be sold to those desiring to do their own recording.—THE END

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Get more information. Circle 432, page 93

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Attache Case combining Sturdiness with appealing Design.

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• Portable—Lightweight
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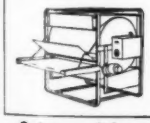

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Get more information. Circle 414, page 93

LETTERS

(*continued from page 22*)

in a brush with no bristle contamination. We know from discussions with some of our assureds that your products fill a need in industry for which there is no substitute."]

In conclusion, we would like to recapitulate our position in reference to the safety of our products.

1. Polonium is sealed in a foil by means which have been proven over a ten year period to be effective. 2. The foil is mounted in the product in such a way as to be protected, by sturdy materials and construction, from abrasion or being handled by the user of the product. 3. Prominent warning labels that have been approved by the Federal Trade Commission, Atomic Energy Commission and many State Industrial Health Agencies, are permanently attached to each of our products. 4. Instruction sheets accompany each product, prominently warning and advising the user in respect to possible hazards, and proper steps to take in case the foil is handled after disregarding the warnings. 5. Our license was issued by the Atomic Energy Commission after a most thorough and painstaking investigation by representatives of the Commission. The license which they issued us authorizes our company to redistribute static eliminating devices containing pile made polonium, and exempting the final purchasers of the product from the necessity of obtaining a license from the Atomic Energy Commission. We can assure you that our license would not have been issued if the Atomic Energy Commission felt that there was any danger, as expressed in your article on static elimination.

We submit that the above constitutes ample safeguard for the users of our products. We believe that these safeguards exceed those considered ample by the manufacturers of numerous highly toxic materials normally found in industrial plants. . . .

Staticmaster brushes have been actively sold and advertised over a ten year period and our sales records show an ever increasing demand for our products. It is quite obvious that, if the statements as contained in your article were true, it would not have been possible for us to profitably operate a business that specializes exclusively in the manufacture of radioactive static eliminators. We request an immediate reply to this letter, giving your reasons for printing such a damaging article

(*continued on page 106*)

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for the PROFIT-MINDED Executive

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Get more information. Circle 411, page 93

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1800 N. Spaulding Ave., Chicago 47, Ill.

Get more information. Circle 429, page 93

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Two-hole kit (shown) $13.90

For binding scrapbooks, photo albums, records and papers of all types. So handy, so easy, so versatile . . . for home or office. Just insert pages and punch, then pick a colorful binding tube from the spin dial base, snap into place. In seconds you have a neat, orderly looking, colorful volume.

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TAUBER PLASTICS, INC.
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Get more information. Circle 521, page 93

LETTERS

(*continued from page* 105)

without first obtaining information relative to the favorable aspects of radioactive static eliminators.

Yours very truly,
Richard M. Evleth, President
NUCLEAR PRODUCTS CO.
El Monte, Calif.

In the portion of the article to which Mr. Evleth refers, David B. Eisendrath, Jr., said: "No discussion on the use of ionized atmosphere would be complete without mentioning the use of radioactive materials such as are used in atomizers and brushes sold to remove dust and neutralize film surface. My own experience with the brushes has been that they have a short life of real effectiveness. They are not used by most of the professional labs I know of, and many industrial medical departments have said they were dangerous because of the possibility of small flakes of radioactive material becoming dislodged and inhaled. I'm sticking my neck out in saying this, but several of the large film manufacturers have concurred with this opinion."

MEMO ON MONEY

(*continued from page* 57)

technical work or reportage.

A recent announcement for a large city listed nine vacancies in the grade of Photographer at $4,000 to $5,080 per year ($180 in annual increments over a six year period.) This position required at least three years experience, although school could be credited toward this requirement.

This scale is pretty close to the Federal GS-5, both as far as experience required and salary offered.

These pay scales typify one of the problems of civil service. The entry salaries are comparable (and in rare cases, superior) to corresponding jobs in private industry but the ceiling tends to penalize above-average ability, experience or responsibility.

Talks with government photographers, however, revealed one compensation which cannot be measured in money. This is the wide range of assignments and the challenges presented to photographers, especially in the areas of scientific and instrumentation work. The civil service cameraman covering a history-making missile firing or atomic bomb test for $6,000 is not apt to envy a higher-paid but less traveled colleague whose work consists largely of portraits of "our beloved founder" and assorted off-spring.—THE END

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- For precise analysis of black & white or color negatives and positives.
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makes negative scratches disappear!

EDWAL NO-SCRATCH
New discovery! Apply a few drops to scratched negative—place in enlarger—make print and *presto!* Not a scratch in sight! ½ ounce, $.89—4 ounces, $3.95.
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Get more information. Circle 435, page 93

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FILM SERVICING and DISTRIBUTION PROBLEMS SOLVED
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FILM STRIPS—CUT, CANNED and PACKAGED
ALL SERVICE HIGHLY PERSONALIZED TO MEET YOUR NEEDS
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"TOPS FOR DARKROOM EFFICIENCY"
- Automatic Exposure Control
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- Saves time and paper

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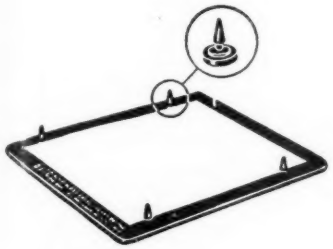
CLARKE Borderless Easel

Saves Time—Saves Money—Saves Paper



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3½x5—$3.00 5x7—$4.00 8x10—$5.00 11x14—$6.00
All Four Sizes for Only $15.00

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music!
to score your films by
COMPOSED AND RECORDED
WITH *YOUR* NEEDS IN MIND
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IND. MOTION PICTURES
(*continued from page 34*)

the first one, the critic shows the unforgettable short opening scene in *Great Expectations*. He repeats it in various ways six times. We see this scene, now shot by shot, now with frames frozen, now by putting in a shot that never appeared in the completed film. He shows the students that the great effectiveness of the scene was achieved chiefly by leaving this one shot out, a shot that, if one were to follow the rules of conventional cutting, should have been permitted to remain.

The second of the series analyzes a sequence in the documentary film, *The Overlander*. The commentator shows how the sequence reaches a breathtaking climax through the use of closer and closer shots and by the rhythm of the cutting.

In the third film, the analyst diagnoses the brilliant construction of *Otld Man Out*. He shows how a mood was created and sustained throughout the film. I obtained these films from Leo Dretfield of the Contemporary Film Library in New York City.

I am aware of the fact that, in addition to being a craft, film making is an art and the originality of every art depends on experimentation. But each "experimenter" must learn what was discovered before he came along. Otherwise, he may "discover" after great effort that his "new" discovery has become obsolete. Has in fact, been obsolete since Edwin S. Porter made *The Great Train Robbery* in 1903 or has been known since David Griffith made *The Birth of a Nation* in 1915.

Of course, working with experienced film directors and editors is the best training a potential film maker can have, but if this is not possible, every film maker should at least read as much of the available literature as possible. There are dozens of excellent books on a professional level. I can mention only a few:

Karel Reisz *The Technique of Film Editing* • **Don Livingston** *Film and the Director* • **Raymond Spottiswode** *Film and Its Technique* • **Jean Benoit-Levy** *The Art of the Motion Picture* • **Sergei Eisenstein** *The Film Sense* • **Lewis Jacobs** *The Rise of the American Film (a classic)* • **Lewis Jacobs** *Introduction to the Art of the Movies (just published by Noonday Press)*

There are scores of excellent books, too numerous to mention here. If you are interested, write and ask for PMI's Amphoto Catalog of books on photography.—THE END

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- Continuous Reflex Viewing! No Parallax!
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- Variable Speeds — 8 to 80 Frames Per Sec.!
- Motorization Provision!

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Get more information. Circle 532, page 93

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A MAJOR PROTECTIVE COATING FOR DARKROOMS

Now used by over 3,000 photographers industrial-commercial-amateur-government to make low-cost, durable sinks, trays; reline pitted sinks; coat and resurface work areas, etc. PRO-CHEM resists photo chemicals; is easy to apply right from can; won't rot or crack.

Write:

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Get more information. Circle 504, page 93

NEW Yankee INSTANT FILM DRYER

- DRIES FILM IN 2 MINUTES
- IMMEDIATE PRINTING

GOOD FOR YOUR FILM

Yankee PHOTO PRODUCTS
3325 Union Pacific Ave. • Los Angeles 23, Calif.

Get more information. Circle 430, page 93

EARTH MOVERS

(*continued from page* 42)

must first obtain all the footage possible of a particular model. When it is felt that we have enough to show what is desired, the footage is rough edited and then the script is written. From that point either the script or the footage is revised until they compliment each other.

When the script and film are finalized, the edited work print is sent to the Calvin lab for interlocking, preparation of A and B rolls and an answer print with the magnetic stripe. This print is projected and the script is read aloud against the film so that sales, engineering and advertising personnel can check it for authenticity. It is always impressed on the viewers that this is the last chance they will have to preview the film and make any changes that may be necessary.

When final approval has been received the narration is put on tape at the local radio station. This tape is edited and timed to fit the film and appropriate music for the titles and background is selected.

The narration tape and the music are piped into the magnetic projector and recorded on the film. At the lab the sound is re-recorded to an optical track. The final optical sound track does not have the quality of sound that the more conventional systems have, but we have found our system listenable and completely satisfactory for our purposes.

The cost of our films has increased with each new film as we have grown a little more ambitious with each production. The following is the cost per minute of screen time for the four films that have been internally produced.

1. *The Mountaineer,* 8 min., color $47.02 per min.
2. *Progress 5760,* 12 min., color 59.97 per min.
3. *Men, Machines & Marion,* 23 min., b&w 53.31 per. min.
4. *35-M on the Move,* 19 min., color 147.46 per min.

The last film, *35-M on the Move,* was a more costly film to produce for several reasons: It was the first time we purchased an extensive amount of footage from outside sources, it was the first time we purchased the script instead of writing it ourselves, and the titles required special art and photography by the Calvin Co.

The equipment that the company has purchased has more than paid for itself and we are now considering a new Bell & Howell magnetic projector with a synchronous motor and an improved magnetic recording mechanism and amplifier.

For taking the pictures we use a Cine Kodak Special II with 25mm f/1.4 lens, a 15mm converter and 63mm f/2 lenses. We use both 100-ft. and 200-ft. film magazines. The camera is mounted on a Ceco, Jr. tripod.

A Griswold splicer and an S.O.S. 16mm Senior Viewer handle editing chores. The sound is handled by a pair of Rec-O-Kut L-37 turntables with Graytone arms and GE filters. We use a Magnacordette tape recorder. Sound is fed from the turntables and recorder through a Bogen mixing amplifier, Series H-68, then to the projector. A separate Bogen amplifier, Series F-98, is used for montoring. Switches allow us to cue during recording from either turntable or from the tape recorder.

The program has been so successful and has met with such approval by Marion's sales personnel that four more films are planned for 1960. The firm's attitude is summed up by Dudley B. Reed, Jr., Director of Advertising and Public Relations:

"Shovels are not something you can put on a prospect's desk during a sales call. Neither are they always available for a field demonstration. However, our movie program allows us to do the next best thing; show a prospect a number of our machines in actual working situations, in color and pointing up the specific sales points we wish him to see.

"Due to the Photographic Department's inexpensive method of producing movies, we can foresee the time when we will have movies covering most of our entire line of 17 models. If we were forced to use more conventional methods of movie production we would either need a greatly increased budget or we would have to restrict the number of movies produced.—THE END

WORKING PHOTOGRAPHER

(*continued from page* 20)

on a copper based frame with a contact attached to the frame. An induction field was set up so that when the snake moved his body over the field, a contact was made, firing the flashlamps and making the picture. In case the camera was started and the snake changed its mind and didn't strike, the bulbs did not ignite and the unexposed film could just be rewound and used again.

Lester once pointed out to me that every time this device worked and the snake did not strike, 70 flashbulbs did not go off, the film was not wasted, and they saved $15.

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RATE—30¢ per word
Minimum charge—$4.00
"Position Wanted" classification only —15¢ per word
Display ad—$27.00 per inch

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KIER PHOTO SERVICE
Dept. PMI, 1220 W. 6th St., Cleveland 13, Ohio

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INSTRUMENTATION
Data acquisition, Schlieren, high speed, 70mm, telescopic imagery, new oscillography techniques, trajectory systems, R & D and ballistic photography.

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USAF and USN developments, new films, all-weather photography, spectral sensors, modulated intensity printers, flight simulators.

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MOTION PICTURES
Standards, high-speed illuminants, underwater cinematography, processing, printing.

COLOR
Masking, quick-access color, color slides from black and white artwork, spectral response.

EMULSIONS AND PROCESSING
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ADVERTISERS' INDEX

APRIL 1960

AMERICAN PHOTOGRAPHIC APPLIANCE CORP. 76
AMPHOTO 103, 109
ANKEN CHEMICAL & FILM CORP. 81
ANSCO DIVISION (General Aniline & Film Corp.) ..... 25, THIRD COVER
ARRIFLEX CORP. OF AMERICAN 33
ASSOCIATION OF CINEMA LABS, INC. 101
ASSOCIATION OF TRAINING DIRECTORS 107
AUDIO-MASTER CORP. 105

BACH AURICON, INC. 105
BALD EAGLE CORP. 105
BEHREND CINE CORPORATION 8
BESELER COMPANY, CHARLES 27
BOOSEY & HAWKS, INC. 107
BROOKS INSTITUTE OF PHOTOGRAPHY 105
BRUNING CO., CHARLES 20
BURKE & JAMES, INC. 8, 85, 108
BYRON, INCORPORATED 36

CALUMET MFG. CO. ..... 26, SECOND COVER
CAMERA EQUIPMENT CO. 11, 12
CAMERA MART 84
CAPITAL FILM LABORATORIES 13, 14
CINEMA RESEARCH, INC. 90
CLARKE COMPANY, INC. 107
C.O.C. INDUSTRIAL 110
COLBURN LABORATORY, INC., GEO. W. 34
COLOR CORP. OF AMERICA 18
COMPCO CORPORATION 105
CONSOLIDATED FILM INDUSTRIES 56
CORRELLI-JACOBS FILM MUSIC, INC. 102
CUSTOMCRAFT COLOR SERVICE 104

DIMCO-GRAY CO. 102
DIRECTORY OF INDUSTRIAL DEALERS 87
DU PONT DE NEMOURS & CO., INC., E. I. 79

EASTERN EFFECTS, INC. 18
EASTMAN KODAK CO. ..... 6-7, FOURTH COVER
EDWAL SCIENTIFIC PRODUCTS CORP. 106
ELDORADO PRODUCTS, INC. 102

FAIRCHILD CAMERA & INSTR. CORP. 70
FEDERAL MFG. & ENGR. CORP. 85
FISHER CO., OSCAR 31
FLORMAN & BABB, INC. 32
FOSTER MFG. CO. 109
FOTOMATIC CORPORATION 106

GANZ CO., A. J. 78
GENERAL ELECTRIC CO. 23
GENARCO, INC. 18
GEVAERT CO. OF AMERICA 21
GOLDBERG BROTHERS 14
GORDON ENTERPRISES 71
GRAFLEX, INC. 29

HALOID XEROX INC. 83
HEHN ENGINEERING, LESTER 78
HERSHEY MFG. CO. 30
HOLLYWOOD FILM ENTERPRISES 62
HOLLYWOOD VALLEY FILM 105
HOUSTON FEARLESS CORP. 9
HULCHER CO., CHARLES A. 73
HUNT CO., PHILIP A. 77
HYTONE FILM LAB 102

IDEAX CORP. 73

JERI COMPANY, INC., ANDREW 103
JF FILM SERVICE 100
JOHNKE MANUFACTURING CO 103, 105

KALVAR CORPORATION 82
KENRO GRAPHICS, INC. 78
KIER PHOTO SERVICE 109
KINNARD COMPANY 104
KIN-O-LUX, INC. 100
KLING PHOTO CORP. 17
KRANK 'N ROLL 104
KURSHAN & LANG 103

LAB TV 104
LABCRAFT INT'L. CORP. 106
LACEY-LUCI PRODUCTS COMPANY 104
LEEDAL, INC. 24, 80
LEITZ, INC., E. 3
LISCO PRODUCTS CO. 28
LOWEL-LIGHT PHOTO ENGR. 103

MAGNASYNC MFG. CO., LTD. 15
MAGNETIC SALES CORP. 35
MICHIGAN PHOTO SHUTTER CO. 105
MILLIKEN CO., D. B. 86
MINOLTA CAMERAS 60
MITCHELL CAMERA CORP. 66
MOTION PICTURE SERVICE EDITORS 86
MOVIOLA MFG. CO. 63
MULTIPLEX DISPLAY FIXTURE CO. 89

NATIONAL CAMERA REPAIR 86
NATIONAL CINE EQUIPMENT 34
NATIONAL CINE LAB 86
NATURAL LIGHTING CORP. 8
NUARC CO. INC. 102

PAILLARD, INC. 5, 98-99
PAKO CORPORATION 91
PARA-TONE, INC. 22
PHOTOCHRON RESEARCH, INC. 106
PHOTO RESEARCH CORP. 102
PLAN HOLD CORP. 103
PLYMOUTH PRODUCTS CO., INC. 16
POLACOAT, INC. 100
PORTER MFG. & SUPPLY CO. 103
POST CO., FREDERICK 10
PRO-CHEMICAL CO., INC. 108
PROFESSIONAL CINE PRODUCTS 86

Q Q TITLES 107

RADIANT MFG. CORP. 85
RAPID FILM TECHNIQUE 86
READERS SERVICE 93, 94
REALIST, INC. 104
RICHARD MFG. CO. 72

SAMPLE ENGINEERING CO. 85
SCHEIBE ENGINEERING, INC. 86
SEKONIC, INC. 63
SEYMOUR'S (Industrial Service Dept.) 19
SIMCO CO., THE 86
S.O.S. CINEMA SUPPLY CORP. 92
SOCIETY OF MOTION PICTURE & TV ENGINEERS 88
SOCIETY OF PHOTOGRAPHIC SCIENTISTS & ENGRS. 109
SPEEDOTRON COMPANY, THE 106
SPINDLER & SAUPPE 95
STOUFFER GRAPHIC ARTS EQUIP. 72
STRONG ELECTRIC CORP., THE 84

TAUBER PLASTICS, INC. 106

UPSON CHEMICAL CORP. 89

VACUUMATE CORPORATION 106
VALENTINO, T. J. 14
VOSS PHOTO CORP. 28

WATSON CO., FREDERICK 109
WOLLENSAK OPTICAL CO. 72

YANKEE PHOTO PRODUCTS 108

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